







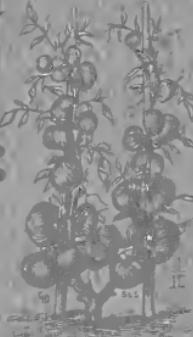
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AMERICA'S GARDEN
LEGACY:
taste for pleasure



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America's Garden Legacy

a taste for pleasure

Edited by George H. M. Lawrence

Eight lectures —
on amenities and history of American horticulture
given in the Bicentennial Year

The Pennsylvania Horticultural Society
Philadelphia, Pa.
1978

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The 1765 garden of William Paca (1740-1799) at Annapolis, Maryland, as re-created in the 1970s.

The 1906 hotel that was built on the site displaced the upper terraces so that the parterres there today are evocative, but imaginary, designs of Laurence Stevens Brigham, landscape architect for the re-created garden. Under the direction of Stanley South, archeological excavations that preceded the reestablishment of the gardens brought to light the outlines of a lake and a system of spring boxes and conduits.

Photo by Marion E. Warren for Historic Annapolis, Inc.

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PREFACE

The lectures recorded in these pages were delivered in a Symposium conducted by the Pennsylvania Horticultural Society in the summer of 1976 as a part of its Bicentennial program. The objective of the Symposium was to give the participants a feeling for the origins of American horticulture and its development over the last 200 years.



1976 Symposium at Bartram's Gardens.
Photo by Robert A. Salgado

There were seven Symposium events each sponsored by a horticultural institution, which acted as host for the occasion. The format called for a tour of the sponsoring institutions' grounds in the afternoon; a reception for the speaker; dinner; and then the lecture. The schedule was:

May 8 — Winterthur, where the spring display was at its peak. Charles van Ravenswaay, Director of the Museum and gardens greeted the participants. The day was sunny and the congeniality of the group was a good portent for the future.

May 14 — Arthur Hoyt Scott Horticultural Foundation at Swarthmore College. The participants were joined by members of the American Association of Botanical Gardens and Arboreta for tours, reception and dinner. Joseph Oppe, Director, saw to it that there was interplay between the two groups and all felt welcome.

June 12 — John Bartram Association sponsored the meeting at Bartram's Garden. The dinner had a historic flavor as Mrs. Henry Evans, President of the Association, presented a menu that would have been familiar to the colonial botanist.

July 31 — Fairmount Park. Robert McConnell, Director, arranged for the group to visit the site of the Centennial Exposition, the historic houses in the Park and places of horticultural interest. Particularly enjoyable was the newly reconstructed Japanese Tea House and Garden.

August 14 — "Chanticleer", Wayne, Pa. Owned by Mr. and Mrs. Adolph G. Rosengarten. The grounds and plantings of interesting plant material were beautifully manicured. The hosts had provided a tent for dinner, which was fortunate, since a thunderstorm broke just as the lecture began.

September 11 — Independence National Historical Park and the Society Hill area. The Pennsylvania Horticultural Society acted as host. The reception, dinner and lecture were shared with the American Horticultural Society which was holding its annual Congress in Philadelphia.

October 23 — the Morris Arboretum. The Director, Gordon Brandes, and his staff, gave every participant a full opportunity to discover the extent of the Arboretum collection before the group adjourned to the Woodmere Art Gallery for the reception, dinner and final lecture.

The Pennsylvania Horticultural Society owes a particular debt to Dr. George H. M. Lawrence for his editorial work in preparing the lectures for publication and his own contribution to the documentation. He succeeded in capturing the continuity that developed over the course of the Symposium as the participants became familiar with the subject matter and acquainted with one another. More than a few have suggested that we not wait a century to arrange another Symposium.

Richard W. Lighty, Chairman
Pennsylvania Horticultural Society
Bicentennial Symposium Committee

March 1, 1977

Introduction

The Bicentennial year 1976 stimulated an abundance of literature. One would wish that more of it had been given to horticulture and gardening. One of the country's outstanding retrospective studies of the latter is embodied in this Society's copiously annotated and erudite exhibition catalogue — *From seed to flower: Philadelphia 1681-1876*.

For the bicentennial year, the Pennsylvania Horticultural Society further demonstrated its leadership by sponsorship of a 1976 Symposium, America's Garden Legacy, and opened to subscribers the opportunity to attend seven lectures, scheduled from May through October, delivered by speakers of national repute from across this country. Eleven horticultural organizations of eastern Pennsylvania and adjoining Delaware shared the hosting of the accompanying tours, and the receptions and dinners associated with those lectures. This volume consists of those lectures, augmented by an eighth sponsored jointly by the Arthur Hoyt Scott Foundation of Swarthmore College and the Providence Garden Club of Pennsylvania.

The Pennsylvania Horticultural Society, oldest in the nation and with lifetime headquarters in Philadelphia, was founded in 1827. The strong horticultural interests of William Penn, founder of the Commonwealth, contributed materially to early recognition in the area of plants important for ornament as well as for food, shelter, and fuel. America's first botanist, the English emigrant James Logan (1674-1751), settled some four miles from Philadelphia in 1699. John Bartram was born there the same year (1699), his cousin and fellow plantsman Humphry Marshall was born there in 1722. Philadelphia became the center for American horticultural activities from the early 1700s until well into the 1800s. Men of the area, such as M'Mahon, Landerth, and the Pierce brothers did much to promote the craft and to increase the availability of an ever expanding inventory of plant materials. In 1785 there was founded a group that was as much horticultural as otherwise: The Philadelphia Society for Promoting Agriculture. A tradition for horticulture, established then, has continued uninterrupted to the present. Plantsmen of the Philadelphia area have indeed given America a major part of its rich garden heritage.

The eight lectures published here are a partial documentation of this heritage. Understandably they feature the people and accomplishments of one metropolis and its environs—Philadelphia. It is an impressive record. Readers should keep in mind also that nearly comparable records exist about the people and accomplishments at other horticultural centers of this country: Boston, New York, St. Louis, Atlanta, New Orleans, and Los Angeles, to mention a few. Each has contributed substantially to America's garden heritage. Each has justifiable pride in its own achievements. Each has the opportunity to add to the fabric of bicentennial literature its record of contributions horticultural.

The printed record of these lectures brings into one volume an assemblage of essays on American horticulture and landscape history to be found nowhere else. More important, the collective citations of more than 175 books and articles provided in footnotes and reference sources, serve as an up-to-date and reasonably complete bibliography of supportive documentation.

There is a tendency in retrospective studies such as these to think of America's gardens largely in terms of ornamental plants and landscapes. Gardening, in terms of today's realities, is focused on ornamentals—plants as grown indoors and outdoors. To many Americans vegetables are packets of frozen pre-cooked dietary necessities; fruits are purchased frozen, or preserved in liquid, more often

than when fresh; and homemade medicinal preparations from vegetable sources are virtually eliminated. All of these were once a part of the American garden scene. They may become so again, and for some items sooner than one may think.

Balanced retrospective accounts of the place of plants and gardens in America must treat fairly the place of the vegetable and fruit garden, of culinary and medicinal herbs, as well as those plants important as ornamentals. Abundant opportunity remains for new and exploratory investigations into these facets of garden history. For ornamentals as well as comestibles we have waited too long for penetrating and also readable studies of horticulture's past and present impact on this nation's economy. Collectively all of these have a part in our American garden heritage.

George H.M. Lawrence
Editor

June 1977

Philadelphia Heritage: Plants and People

Joseph Ewan

Just when did a study of plant lore and garden culture in a serious way with lens and spade begin in the Pennsylvania colony? I suggest it may well have started with James Logan, who had come to America from England in 1699 with William Penn and who served as his secretary. In 1736 Logan wrote from his home Stenton, located on 18th at Courtland, lower Germantown, to John Bartram that he had received from Peter Collinson six "very large sheets," the folio first edition of Linnaeus's *Systema naturae* of 1735.¹ "I would send it to thee," wrote Logan, "but being in Latin, it will want some explanation . . . If thou wilt step to town to-morrow, thou wilt find me there with them, at E. Shippen's, or J. Pemberton's, from 12 to 3." These "very large sheets" which measured about 21 x 16 inches were designed by the Swedish naturalist to classify in an "overview" the animal, vegetable, and mineral kingdoms. Not since Aristotle had devised his *Scala naturae* had there been an attempt to tabulate the world's features. Logan sought to understand Nature's "grand plan" and he believed Bartram would like to know how Bartram's botanical discoveries, small and local, fit into the global grand design.

Eighteenth century American botany centered about the Bartrams,² as the nineteenth century did about Asa Gray. First there was John Bartram,³ a farmer turned botanist who kept a growing garden (rather than a nursery or botanic garden) from about 1730 until his death, during the approach of the British troops, in 1777. Bartram's garden was a meeting place for naturalists, a mecca for



Dried plant specimens collected by John Bartram from the Sutro Library collection, San Francisco.

travellers, and John, without technical schooling in the sciences, assiduously explored and collected "curiosities" for Peter Collinson in England and his friends.

Peter Collinson (1694-1768), haberdasher and mercer with commercial contacts in America, a Quaker like Bartram and five years his senior, enjoyed growing "exoticks" from seeds and plants imported as a sideline to his business — which he insisted must have priority. These he grew at Peckham or in later years at Mill Hill. No single Englishman during the first half of the eighteenth century was more important in the progress of botany and horticulture back and forth across the Atlantic. Dried plant specimens made by John Bartram survive today preserved principally in the British Museum (Natural History) but unexpectedly also in the Sutro Library, San Francisco.⁴ Incidentally, Adolph Sutro, mining engineer and mayor of San Francisco, during the late nineteenth century amassed a library of 250,000 volumes. Over one-half of the library, including many incunabula, was destroyed in the earthquake and fire of 1906, but the albums were spared.

Shortly after Collinson wrote to Bartram on January 24, 1735, that "very curious person," Lord Petre at Thorndon, Essex, who also grew plants from foreign lands, joined the coterie of patrons who contracted with Bartram to collect seeds — "100 species in a box at five guineas each." Petre made a *hortus siccus* in the form of albums or folio scrap books of dried plant specimens snipped from his garden and stove. In Petre's albums are specimens of groundsel bush from "Cape May," sweet fern, moosewood, ginseng, and "beech plum," collected by Bartram.⁵ The botanist tracing authentic specimens in support of original descriptions will find the Petre albums important. John Bartram's label for a pine barren gentian reads, "this curious flower I gathered in ye desert as I came from Cape may it is peranuall." Witmer Stone mistakenly credited William Bartram (1739-1823) as its discoverer saying that as a lad Billy had sent a drawing of this gentian to George Edwards, but the Petre specimen tells us that his father collected it about the year Billy was born. In 1791 Prof. Johann Friedrich Gmelin of Göttingen named the species *Gentiana porphyrio*, referring to the purple gallinule from the flower color. The plant is now treated as a color form of the pine barren gentian, *G. autumnalis*.

Bartram's key role in American botany is often locked behind the records of others, as those of Peter Kalm,⁶ who visited Bartram and bore off botanical prizes to Linnaeus. Two decades after the Royal Swedish Academy of Sciences was founded the search for new plant productions for Sweden's demanding climate began. Peter Kalm was elected in 1745, made docent of natural history and economy at the Academy at Åbo (Turku), then Sweden, now in Finland. He was funded largely by private patrons, Baron Bielke for one, and in part by the Swedish Academy for a visit to America, primarily to seek a mulberry that would endure the severity of the Swedish climate, and that would support a potential silk industry. Fortunate indeed that Kalm had such a versatile interest and observing eye. He was a solid scientific observer. No single commentary on the mid-eighteenth century Atlantic colonies tells so much of natural history, social mores, and general *modus vivendi*, as Kalm's *Travels into North America*. Yet his narrative records only the first 14 months of the 31 Kalm spent travelling from Delaware to Quebec. Not only are there notes on melons, maize, sugar maple — something for Finland — wax myrtle, ginseng, lobelia as an anti-syphilitic, rattlesnakes, 17-year locusts, bison, and so forth, but a note, for example, on "a very peculiar diverting custom" in marriage, at least across the Delaware: "When a man dies, and leaves his widow in great poverty," that is, is insolvent "and all that, if there is a person who is willing to marry her, she must be married in no

other habit than her night gown." Thus she leaves to the creditors of her deceased husband her clothes and contents of their house, keeping only a night gown to cover her.

Peter Kalm arrived September 15th 1748 on the *Mary Gally* from London where he had visited Peter Collinson and his circle. Three days after his arrival he visited Mr. Bartram and, characteristically, made a catalogue of 58 trees he observed in his four mile walk from Philadelphia to Bartram's house. Kalm tells us "Mr. John Bartram is an Englishman who ... has acquired a great knowledge of natural philosophy and history, and seems to be born with a peculiar genius for these sciences. In his youth he had no opportunity of going to school, but by his own diligence and indefatigable application he got, without instruction, so far in Latin as to understand all books in that language and even those which were filled with botanical terms .. We owe to him the knowledge of many rare plants which he first found and which were never known before ... I, also, owe him much, for he possessed that great quality of communicating everything he knew."⁷

James Alexander was the first professional gardener we may identify in the colonies. He was in charge at 'Springettsbury,' the country seat of Thomas Penn who was one of Catesby's "encouragers" in support of the publication of his *Natural history*. Alexander was especially successful in the cultivation of orange, lemon, and citron trees. He was elected to the American Society March 4, 1768, and one wonders if he were in touch with Edward Antill, the grape enthusiast. Letters between Alexander and the Earl of Loudoun beginning in 1754 detail the hardships of the field collector and the dissatisfaction of the patron.⁸ In the one year 1758 no less than 87 different trees and herbs including pines, oaks, hickories, monardas, rudbeckias, and "wild oats" whatever that was (!) were boxed for the Earl who in turn supplied consignments to the Duke of Argyll, the Earl of Sutherland, and six others. Complaints came back to Alexander that he had sent not enough variety, or too few seeds of each sort. Alexander replied that John Bartram, "a man of considerable estate," was favored by long experience and whereas he was expected to send trees and plants, Bartram happily provided seeds.

George Edwards (1694-1773), a self-made artist and naturalist, who held a sinecure librarianship at the Royal College of Physicians, began drawing birds at the age of 45. Edwards acknowledged his indebtedness to the Bartrams for specimens of birds — skinned, dried, or shipped in spirits — as well as descriptions and drawings. At seventeen William Bartram received drawing instructions from Edwards overseas, and his early work shows the style designated by Iolo Williams as "magpie and stump." Although Bartram was to mature artistically, Edwards at 62 was drawing much as he had for his first *Natural history of uncommon birds* (1743-51). In volume 5 of his supplementary work *Gleanings of natural history* (1758) Edwards redrew William Bartram's pine-barren gentian (*Gentiana porphyrio* Gmel. or *G. autumnalis* L.), "rather as a decoration" to the Magnolia warbler plate, adding from his antiquarian affections the mythical fern known as the "vegetable lamb of Tartary."⁹

Competition was rife in early horticulture although we overlook its role when we acknowledge the eminences. The elder John Bartram, without doubt the leading eighteenth century figure in our story of gardens, met competition from William Young, Jr. who lived on a farm down the road along the Schuylkill River. Young at least as early as 1761 — he was then nineteen — attracted the attention of Dr. Alexander Garden of Charleston who introduced him by letter to John Ellis of London as "a sensible careful man."¹⁰ Young went to London where he was a pupil of the entrepreneur John Hill, author of numerous popular books

on plant lore, some most elaborate. Young ingratiated himself with Royalty and was appointed "Botanist to their Majestys" in 1764. To meet this challenge Peter Collinson "by repeated solicitations" succeeded in gaining the appointment of "King's Botanist" for Bartram. In 1766 Young returned to Philadelphia, and Bartram wrote Collinson that Young "struts along the streets" of Philadelphia "whistling," and that he had come to the garden three times since his return.

Young collected 302 Carolina specimens and made crude drawings in color: these are preserved today in the British Museum (Natural History). He delivered the first living plants of Venus fly-trap to England in 1768, from which John Ellis had a drawing made and plate engraved, the drawing and description published in 1770. But it was John Bartram who had sent to Collinson the first dried specimen of *Dionaea* in 1763. William had included a small drawing of Tipitiwetchet on his drawing of *Nelumbo lutea* in 1765/66. Young's Catalogue was published in Paris at the close of the American Revolution, the same year in which John Bartram, Jr. issued his sales broadside of American plants. That both Bartram's and Young's American lists appeared in France is testimony of plantsmen's lively interest in novelties during the decade when Andre Michaux began his exploration and introduction of Atlantic coast plants to France.

James Cox arrived in Philadelphia on August 5, 1785, "after a tedious and disagreeable passage of nine weeks," and three days later went to see William Young. He carried instructions from the President of the Royal Society, Joseph Banks, to find certain plants in the Pennsylvania hills. Cox wrote to Banks in September of his failure to find the wanted herbs but added "if you want any snake root I can get any quantity fresh twice a week at the Market here." Mrs. Young told Cox her husband "went out in June last to South Carolina in quest of plants, and on his return home the latter end of July he was unfortunately drownded by fording a place called Gunpowder falls 94 miles sw of [Philadelphia]."¹¹

Arbustum Americanum, "The American grove," holds a "first" as being the first book on native trees and shrubs published in America.¹² Humphry Marshall, a cousin of John Bartram, was the son of a Quaker stone cutter who farmed near the west branch of the Brandywine where the village called Marshallton took form. As John Bartram had sent seeds and plants to Collinson, William Bartram and Marshall later shipped seeds and plants to the Quaker physician John Fothergill for his garden begun in 1762 and planted until his death in 1781 at Upton in Essex. Marshall constructed the first conservatory in the colonies in Chester County in 1764, having dug the clay, and made the bricks, himself. By 1780 Marshall had started writing his *American grove*. He was then in touch with Dr. Thomas Bond, who had studied botany in France with de Jussieu over forty years before. Bond certainly put Marshall in touch with French arboriculturists including the King, who had examined "every article of our collection," wrote Dr. Bond, and who was "extremely pleased with it." Three years after its publication in Philadelphia the *American grove* was to be translated and much extended by Lezermes, assistant arborist to the King, and published in Paris. However it was Samuel Vaughan, a wealthy Jamaica planter who had settled in Philadelphia in 1782 because of his friendship for Franklin, who had sponsored Marshall's book. Marshall had "no view of private emolument" but to put to press as soon as there were a sufficient number of subscribers. It was Vaughan who paid Joseph Crukshank, a prominent Philadelphia printer, £70 2s. and 6d. to print one thousand copies, and paid for newspaper advertisements announcing the *Grove*. But the book sold slowly. As Sarah Stetson has put it: "America was quite unready for botanical instruction." In Philadelphia the *American grove* sold

for 3s. 9d. by subscription and in England for three shillings, where it enjoyed a good sale. In 1788 a German edition appeared in Leipzig. German foresters were interested in augmenting their dwindling timber reserves.

Though I have suggested to several susceptible persons that he or she bring together what we know about William Hamilton (1745-1813) of the "Woodlands," we still have no adequate account of perhaps the most ambitious devotee and guardian of the richest collection of native and exotic plants in America.¹³ His collection of living plants and library were dispersed on his death; indeed, only one of his books has come to my notice. A presentation copy of William Bartram's *Travels* (1791) may be seen in the Library of the Morton Arboretum. The title-page is inscribed "W. Hamilton's Book given to him by the author June 9th 1799." Were the six original hand-colored plates in this presentation copy of the *Travels* given to Hamilton with the book, or what is their history? Do they bear on the lost "drawings for Mr. Barclay" which I described in *William Bartram. Botanical and zoological drawings?* What seems certain from William Bartram's laid-in list of "errata" numbering 28 items, is that the author did not see proof of his *Travels* as it was passing through the press in Philadelphia.

Bernard M'Mahon in 1806 published the first American planting guide, *The American gardener's calendar*. M'Mahon came to Philadelphia from Ireland, probably first worked in Landreth's nursery, then opened a successful plant business of his own. He was befriended by Jefferson, admired by Nuttall. In 1804 M'Mahon had sold seeds and fruits of 44 different North American plants to a dealer (?) in Amsterdam through the offices of John Vaughan and the American Philosophical Society. Included in that sale were two quarts of red maple, two oz. bittersweet, half a bushel of black walnuts, and four oz. "Rhododendron maximum (pure seed)" but there was no *Franklinia*. With generosity noticed on other occasions, M'Mahon rounded off the bill for \$115.50 with the note "one hundred dollars will satisfy me, the remainder I make a present of to the Society."¹⁴

Certainly the lasting national aspect of M'Mahon's career was his relation with the Lewis and Clark Expedition and the pact between M'Mahon and the warm and erudite Jefferson. Jefferson had hoped to protect the publication rights of the Expedition's leaders and of the Government by restricting the widespread immediate public distribution of the novel seeds and plants brought back. Meanwhile their description and publication were interminably delayed by Professor Benjamin Smith Barton, who had been officially designated to announce the discoveries. The exchange of correspondence between M'Mahon and Jefferson began with the nurseryman's letter of Dec. 26, 1806, from Philadelphia, asking for a "small portion of every kind [of seeds]" received from Capt. Lewis on his return.¹⁵ Then M'Mahon digressed from Expedition matters to report on the snake gourd (*Trichosanthes anguina*), from India which was being cultivated by Jefferson: "Of the Cucurbita you were so kind as to send me, some grew to the length of five feet five inches. I have one of them now in my shop window, perfectly dry, which is five feet one inch long, perfectly straight and in every part about four inches in diameter: they are excellent to use, as squashes while young." Jefferson complied with M'Mahon's request for seeds from Missouri River Expedition, saying he had recommended that Capt. Lewis "confide principal shares" of the botanical novelties to Mr. Hamilton of the Woodlands and to M'Mahon "as the persons most likely to take care of them." Letters passed back and forth between M'Mahon and Jefferson, until May 30, 1813, often fragrant with notes on the plants brought into flower under M'Mahon's care. There were weeds, too, in M'Mahon's greenhouse. Some were classic, such as the pineapple weed (*Matri-*

caria matricarioides) brought back in the saddlebags of the Lewis and Clark Expedition.

A frequent visitor to M'Mahon's nursery was the German botanist, lynx-eyed Frederick Pursh, who was hired by Barton to assist in the preparation of the botanical text for the Expedition. Pursh lived in M'Mahon's house for a while before giving up in despair over Barton's procrastination and moving to Dr. David Hosack's Elgin Botanic Garden in New York. Pursh announced pineapple weed in 1814 in his *Flora* published in London as the strong-smelling *Santolina suaveolens*. Pursh belongs in our story of the *American gardener's calendar* because it was he who gave M'Mahon the impetus to write this "most useful practical work."¹⁶ Such was the testimony of David Landreth, the younger, who, writing in *The Horticulturist* in 1858, accords to "an educated, observant" Pursh the chief credit for the *Calendar*. M'Mahon died at his "Botanical Garden called Upsal" Wednesday morning, September 18, 1816. Less than two years later Thomas Nuttall dedicated the handsome shrub *Mahonia*, "in memory of the late Mr. Bernard McMahon whose ardent attachment to Botany, and successful introduction of useful and ornamental horticulture into the United States, lays claim to public esteem."

Brazil owes its name to a plant^{16a}, and osage orange (*Machura pomifera*) gave its name bois d'arc to the Ozarks. The Osage Indians valued the wood for their bows, root bark for its dye stuff, and, the Indians say, they appreciated the exquisite fragrance of the ripening fruit. Meriwether Lewis wrote a long letter from St. Louis to Jefferson March 26, 1804, describing what he called "osage apple."¹⁷ It had been introduced to Lewis five years before by Pierre Chouteau, fur trader and Indian agent, who had obtained young plants at the great Osage village, in present Vernon County, Missouri. The source of the introduction by the Osage tribe, however, was said to have been in the vicinity of present Dodge City, western Kansas, but there it was uncommon. It is curious that such a distinctive tree, with such unusual fruits, which had been known from 1799, should not have been adequately described and named until 1818. Then it was Nuttall who named osage orange for William Maclure, geologist and patron of naturalists. As it happened, five months before Nuttall's publication Rafinesque had given a name to the tree, with his usual casualness, yet his intent is unmistakable. Bois d'arc had already been growing in Philadelphia for ten years and the observing Rafinesque had noted it was nameless. Though both M'Mahon and Hamilton had been favored with packets of various seed from Lewis, Hamilton wrote Jefferson his seeds had not yet "vegetated freely" except his "osage apple," as he called it, and some kinds of gooseberries and currants.¹⁸ And so we have this record that *Machura* was growing in two gardens in Philadelphia by 1808. We have no exact information on the longevity of the tree. Prof. Sargent (*Silva of North America* 7: 89. 1895) states that the log in the Jesup collection, from south Arkansas, was 24½ inches in diameter and showed 134 annual rings. An osage orange planted near Brookneal, Charlotte Co., Virginia, is 24 feet 6 inches in diameter at 4½ feet above ground, is 51 feet high, with a spread of 93 feet.¹⁹ Probably the trees to be seen today about Christ Episcopal Church on Second Street near Market, Philadelphia, may be replacements, but their location adjacent to M'Mahon's seedstore cannot pass unnoticed.

Incidentally, M'Mahon, evidently alone of the Philadelphia horticulturists, sold botany and gardening books as a regular feature. We judge this from a unique broadside of which we have only the upper half of the original because Benjamin Smith Barton used it for a memorandum he jotted on the back. It is

fortunate such scraps of his personal correspondence were saved after his death in 1815.²⁰

David Landreth (1752-ca. 1828) arrived in the United States in 1781, began growing seeds for the trade three years later, and developed the first nursery stocks of camellias and rhododendrons in the city. The oldest trees of Independence Square today came from Landreth's nursery. The first *Catalogue* of seed and nursery stock of David and Cuthbert Landreth I encountered was in the library of the rosarian and enthusiast of cacti and succulents Gordon D. Rowley of the Department of Botany in Reading, England.²¹ This *Catalogue* was issued in Philadelphia in 1824, contains 48 pages, offers "greenhouse plants," as well as hardy sorts, vegetable and flower seeds, and concludes with "observations on transplanting trees." In their friendly preface we read that "Considerable expense has been incurred in procuring useful and ornamental trees and plants, as well in our own Country as in Europe, China, &c; and from the arrangements we have made with our correspondents in Europe and America ... [although] for many years past we have grown the greater part of the seeds sold by us." Later I saw the 1832 edition at the Pennsylvania Horticultural Society the title-page of which is illustrated in *From seed to flower*.²² As the latter book was going through the

CATALOGUE

OF

GREENHOUSE PLANTS,
HARDY TREES,
EVERGREEN SHRUBS,

FLOWERING SHRUBS,
BULBOUS ROOTED, AND
HERBACEOUS PLANTS.

ARRANGED BY THEIR

BOTANIC AND ENGLISH NAMES

With a collection of the most esteemed varieties of

FRUIT TREES

SOLD BY

DAVID AND CUTHBERT LANDRETH,

NURSERY AND SEEDSMEN,

Federal street, near the Arsenal, Philadelphia.

PHILADELPHIA:

PRINTED FOR THE PROPRIETORS

Fry and Kammerer, Printers.

1811.

The earliest known edition (1811) of the David and Cuthbert Landreth *Catalogue*.

press, the earliest known edition (1811) came to light among the Society's stowaways. It is especially interesting to compare the garden and greenhouse offerings in these three catalogs; indeed, these are source materials in any writing of our history of horticulture. Let us look at some details: first, I as a botanist applaud the scholarly priority suggested in the sequence "arranged by their *botanical* and English names." Landreth and after him, M'Mahon, knew the botanical references and often sought out the field botanists to bring knowledge and novelties into their business. For example, take the buckthorns in this 1811 Landreth Catalogue. The first "Rhamnus sp. nova from Tennessee" will be described three years later as *Rhamnus lanceolatus* by the botanist Pursh, who based the buckthorn described there on John Lyon's specimen seen in that plantsman's herbarium. If we turn to the *Catalogue of plants collected by John Lyon just arrived from America*, printed for his London customers in 1812, we see it listed there as "Rhamnus sp. nova (Tennessee)" — so the story comes full circle, the nurserymen featuring novelties and the botanist describing them for science.²³

Now for a glance at the seven sumacs in this Landreth Catalogue of 1811: three of the names represent two species well known to you, smooth and staghorn sumacs; *Rhus elegans*, based on a Catesby plate, is *Rhus glabra*. Oddly three of Landreth's offerings are "venemous," to use Nuttall's adjective, poison ivy, swamp sumac, and *Rhus pumila*, "extremely venomous." Just what the customer was about to use these miscreants for is not suggested, but they all reappeared in Landreth's 1824 Catalogue, priced at 24¢ each. The seventh name, *Rhus cotinus*, is the old name for the smoke tree (now *Cotinus coggygria*).

Appended to Landreth's Catalogue of 1824 is a note: "the following plants have been received, which will be offered for sale in the autumn of 1825 — many of them are exceedingly rare and beautiful, a number of which have been presented by our friend the professor of botany at Cambridge, Mass., and author of that excellent work, *Genera of North American Plants*." Then follows a list of 160 species, but none was from Thomas Nuttall's North American journeys. So the seeds delivered to Landreth must have been sent to the Harvard Botanic Garden from South Africa and the West Indies. Some were probably from the botanic garden of St. Vincent through Rev. Lansdown Guilding. Rev. Guilding, a native of St. Vincent and graduate of Oxford, noted in his *Account of the garden*, published in 1825, that he had been in correspondence with gardeners in North America.²⁴

"Though more than forty years ago, I distinctly remember the first time I saw [Thomas Nuttall], standing beside my father, in the dusk of a summer's evening." David Landreth's recollection appeared in *The Horticulturist* in 1858. Landreth continued: "a stranger, of quiet manner and careless toilet, presented a letter, which proved an introduction from [John] Frazer, [sic] a botanist of some repute, who had been a plant-hunter in America. Nuttall had previously been in this country in the capacity of a journey-man printer. . . . Mr. Nuttall is so well remembered by Philadelphians of botanical taste — indeed by all in every department of science — at least of the generation which is daily lessening, that any description of him would be almost superfluous. . . . Though the bent of his mind was to precise studies, he had descriptive and reflective powers of more than ordinary beauty, and had he cultivated literature as ardently as science, he would assuredly have reached distinction."²⁵

Dr. Caspar Wistar was a well loved professor of anatomy at the University of Pennsylvania, and his *System of Anatomy*, the first American text on that subject, passed through several editions. Born in Philadelphia in 1761, he received his

M.D. at Edinburgh University in 1786, and occupied a prominent place in Philadelphia cultural life. He kept open house ("Wistar Parties" they came to be called) on Sunday evenings at his large mansion at corner of Fourth and Prune (now DeLancey) Streets. Chief Justice William Tilghman, said "his eye beamed good will, and his whole air brought strongly to my mind what Tacitus says, in his description of Agricola, 'At first sight you would have believed him good, and wished him to be great.' This ruling sentiment threw grace over his actions."²⁶ Mease shared Wistar's enthusiasm for paleontology with Jefferson and wrote articles on the subject for *Transactions of the American Philosophical Society*, of which he was president when he died in January 1818. At that time Nuttall's *Genera of North American plants* was passing through the press and he described the genus *Wisteria* "in memory of Caspar Wistar, M.D. . . . a philanthropist of simple manners, and modest pretensions, but an active promoter of science."²⁷

Few intellectual subjects did not interest Dr. James Mease (1771-1846). A native of Philadelphia, son of a wealthy shipping merchant and Revolutionary patriot, James took his M.D. degree at the University of Pennsylvania in 1792 but before that he had published on hydrophobia. He was a frequent contributor to historical journals, a manager of the Company for the Improvement of the Vine, active in the Philadelphia Society for Promoting Agriculture,²⁸ author of a *Geological account of the United States*. He also edited the first American edition of *The domestic encyclopedia*, and was one of the founders of the Pennsylvania Horticultural Society in 1827. He also wrote on medals, the penal code, record dimensions of trees,²⁹ smut in wheat, rearing of silkworms, staggers afflicting horses, etc., etc. At seventy he was writing on "thermommetrical observations as connected with navigation." Dr. Mease probably edited the American edition of the *Gleanings* published in Philadelphia in 1803.^{29a}

Almira Hart Lincoln Phelps brought the sciences into the classroom beginning in 1829 with her *Familiar lectures on botany*.³⁰ Mrs. Lincoln followed that with texts on chemistry, geology, and natural philosophy, but none came near the success of her *Botany*, which passed into nine editions and by 1872 had sold 275,000 copies. Born in Berlin, Conn., the youngest of seventeen children — the most famous of whom was Emma Willard — Almira began teaching at Berlin Academy at the age of twenty. Later she taught at Troy [N.Y.] Female Seminary and while there published her *Familiar lectures on botany*, the venation of which shows the influence of the exceptional instructional skills of Amos Eaton at nearby Rensselaer Institute. After the death of her husband Simeon Lincoln by yellow fever Almira married a lawyer and politician, John Phelps. They first lived in Vermont and for a year (1838-39) in West Chester, Pa., where she was principal of a new seminary, then at Rahway (N.J.) Female Institute, and finally at Patapsco Female Institute, Ellicott's Mills, Md. All the while Mrs. Phelps was trying to turn out "good women rather than fine ladies," teaching the sciences, and writing successful textbooks. In 1859 she was elected the second woman member of the American Association for the Advancement of Science. Her *Familiar lectures on botany* discussed both native and foreign plants, their classification (in the Linnaean scheme), anatomy, the effects of cultivation, etc.

Before "the chemical composition of plants" is taken up in Chapter XIX Mrs. Lincoln (or Mrs. Phelps) entreats her pupil: "suffer not your chief thought to be given to the decoration of the perishable part" but seek to prepare the mind for heaven. Yet there is a flow of comment on living plants, and plant lore. She tells the student that "in our gardens we cultivate at least twelve different sorts of foreign strawberries; that of Chili, of Peru, the Alpine, the Swedish, &c." She alludes to the writings of Prof. B.S. Barton: — 20,000 persons may stand under a

Silk cotton tree; from Alexander von Humboldt: — she reproduced his chart on altitudinal zonation of vegetation.³¹ There is singular lore too, for example, that the banana leaf is "broad and long, like an apron; it has acquired the name of Adam's fig leaf." Almira died on her 91st birthday.

The botanist may learn the stage of cultivation from contemporary flower paintings, just as the zoologist studies the dog in a Goya portrait to learn about its domestication. Thus the Peales are valued contributors to horticultural history. Rembrandt Peale's portrait of his brother titled "Rubens Peale with a Geranium, 1801" and James Peale's, "Watermelon and Fruit"³² of about 1820 are historical documents. Then there is the "Blackberries" dating from about 1823 by Raphaelle, the eldest son of "the father of natural history in America" Charles Willson Peale. Raphaelle was portrayed by his father holding palette and maulstick in the "Staircase Group" which you will see at the Philadelphia Museum of Fine Arts. Raphaelle later was in his cups but full of spirit and his most famous "After the Bath," painted as a joke in 1823, shows his "power of precise imitation." By 1823 Raphaelle was painting fruit pieces for vendues, raffling them off, or as gifts to brick layer or carpenter in lieu of cash.

During the summer of 1831, the Scotsman Alexander Gordon made a tour of the principal nurseries and private gardens in the United States. His impressions were published by John Claudius Loudon in Loudon's *Gardener's Magazine* for June 1832. "Gardening, in the United States of America, can never arrive at that degree of perfection which it has done in England: the nature of the American government makes this utterly impossible. The abolition of entails, and the repeal of the law of primogeniture, naturally break down into small portions the estates of even the greatest landholders. It is no uncommon circumstance in America to find lands, formerly held by one proprietor, now divided into forty or fifty parcels, belonging to an many different persons; so that gardening, to any considerable extent, by individuals, cannot be carried on in the same manner as if those possessions were concentrated in the hands of one person. The moment the proprietor dies, his land is equally divided among his children; and, by thus falling into many hands, no one has the means, if he had the inclination, to keep a garden in the manner, and to the extent, which is done by English noblemen and gentlemen. Still, this may be remedied, by uniting, and forming public gardens; the only method by which gardening can arrive at perfection in the United States. I will here add, it follows as a natural consequence, that America is not the proper field for one of our first-rate serving gardeners; and the individual who emigrates to that country must prepare himself for a life of the most strenuous exertion, if he hopes to succeed. But, although this may retard the higher branches of gardening, God forbid I should be considered for a moment as objecting to the system! No: I have seen too many proofs of its efficacy in rendering a whole people independent, comfortable, and happy."³³ Gordon tells of his Philadelphia visit, to the Pennsylvania Horticultural Society meeting where he was introduced to Dr. Charles Pickering, secretary. He visited Hibbert and Buist's nursery. Buist had recently returned from England and Scotland with a collection of live plants, and though a great many died on the voyage of seven weeks, he brought Chinese, Cape of Good Hope, and Botany Bay plants packed in matted baskets.³⁴

Gordon also visited Mr. Pratt's garden in 1831, "long noted," he says, "for its choice collection of plants." Henry Pratt, a shipping merchant, was a "gentleman of the old school, with wig and powder" who brought Lemon Hill to distinction. John McArran had been gardener for William Hamilton at the Woodlands for seven years before he laid out and improved the four acres of Lemon Hill for

Henry Pratt. David Landreth had been one-time gardener there. To see the "splendid and rare" plants at Lemon Hill it was necessary to secure a ticket at Pratt's countinghouse in the city. Probably influenced by Hamilton, and guided by his oldtime gardener, Pratt inherited Hamilton's laurels for tasteful horticulture in Philadelphia with Lemon Hill's cool grottoes, shaded walks, fountains, clipped hedges, and bold flower beds, in the manner of Longwood Gardens today. One of the last awards that came to Henry Pratt at Lemon Hill was the Pennsylvania Horticultural Society \$2 prize for the first mango exhibited, and for a "splended specimen" of poinsettia with bracts spreading twenty inches across, both brought to perfection by Peter Mackenzie, Pratt's last gardener. Pratt died at 77 and it is fortunate that this only known copy of the auction sale's *Catalogue* of 1838 has survived, since the list of 2701 plants (many duplicates) tells a story of traffic around the world in greenhouse subjects.

The entry "1332 *Salvia Fulgens* Fine Flowering Sage" bears witness that this Mexican species with long scarlet corollas was in Henry Pratt's collection. We should try to reintroduce this stunning salvia into cultivation.³⁵

"1367 *Diosma Capitata* Headed [Diosma]" recalls a heath-like xerophyte long known in southern California gardens for its pungent foliage and dainty white flowers, but this entry in the Pratt *Catalogue* may refer to another South African xerophyte belonging to another plant family, the Bruniaceae. This situation illustrates the complexity of tracing plant identifications today through old lists such as Pratt's *Catalogue*.

"1374 *Eschscholtzia Californiensis* [sic]" — note it has no folk name on the Pratt list — probably was first grown at Lemon Hill from seed distributed by Horticultural Society of London, the seed collected in the spring of 1832 in the vicinity of Monterey by David Douglas.³⁶

"1378 *Mimulus Smithii* Monkey flower" was a cultivar named by Prof. John Lindley in 1834 for an Islington nurseryman, George Smith. It was a hybrid with blotched corollas.

"1301 *Nandina Domestica*" dates from 1804 when the Kew botanical collector, William Kerr brought it back in the East Indian Company's ship *Henry Addington*, Capt. Kirkpatrick. Mr. Kerr supervised "a botanical Painter constantly employed" making drawings of Chinese plants to display to English gentlemen.³⁷ Their choices would assist in deciding which flowers would be popular and should be ordered from China.

"Nestor of American Botany" was Asa Gray's laurel placed on William Darlington (1782-1863). A birthright Quaker born in Chester County, Pennsylvania, Darlington apprenticed to a prominent physician of Wilmington, then took his M.D. in 1804 as another pupil of Benjamin Smith Barton at the University of Pennsylvania. Darlington tells how he was "dismissed" by General Lacey in his suit for the hand of Kitty Lacey, and the General's last minute tergiversation about his daughter's marriage. Even so, Darlington shipped as surgeon on the *Bengal*, an East India merchantman, marrying Kitty on his return. In Calcutta Darlington met William Roxburgh at the Royal Botanic Garden. Professor Barton had been corresponding with Roxburgh who had been a fellow student in medicine at Edinburgh before going to India as superintendent of the botanic garden. Roxburgh wrote to Barton, May 1st, 1807, that Darlington had arrived some three weeks before bearing presentation copies of Barton's two pamphlets on the generation of the opossum. "Dr. Darlington is on the point of departure," Roxburgh wrote, "and has again called on me for what I might have ready for America. I take this favourable opportunity to send you the accompanying parcel of seeds, some of which I hope will produce ornamental plants."³⁸

Like Peter Collinson, Quaker botanical enthusiast in England, Darlington took pleasure in corresponding, exchanging, and giving. George Ord, zoologist in Philadelphia, wrote to Darlington in 1847 that he was sending a parcel of seeds from the professor of botany at the University of Pisa, addressed to the local botanic garden, instructing Ord that if there were no public institution to receive the seeds that he forward them to "the most celebrated establishment of the kind in your country." Ord chose Darlington. Always realistic and pragmatic, Darlington insisted, "we must ... learn to direct our efforts to the attainment of such portions of instruction as may be found practicable."³⁹ Leaders in American science have acknowledged the critical role of the amateur. Darlington also recognized this. "I am convinced, that knowledge must ever remain more or less partially distributed." This was the open philosophy of the "genial and unsophisticated" Quaker physician William Darlington.⁴⁰

"Seldom has any plant excited such attention in the botanical world"⁴¹ as *Victoria amazonica*, (*V. regia* a syn.) a large subject. It took two elephant folios to tell the story. First to tell it was William Jackson Hooker who employed Walter Hood Fitch in 1846 to do the lithographs for *Botanical Magazine* and, more dramatically for Hooker's 1851 folio on *Victoria regia*. Fitch was "the most outstanding artist of his day in Europe," the most prolific of all botanical artists, was "a typical product of the Victorian era," in the apt words of Wilfrid Blunt.⁴² When Hooker many years later approached Disraeli on granting Fitch a pension the Prime Minister hesitated. Whereupon Hooker showed him the colossal lithographs of the *Victoria* water-lily and so the following year Fitch was pensioned a hundred pounds a year. That same year Hooker sent twelve *Victoria* seeds to Mr. Caleb Cope at his country seat of Springbrook.⁴³ The first seed germinated in twenty days, its growth tended by the skilled hand of Thomas Meehan. A diary of every event, the unfolding of a leaf, the appearance of a bud, was kept until on August 21, 1851, Queen Victoria's namesake flowered for the first time in the United States. By September 1853 the Springbrook celebrity had opened 137 flowers. Then to celebrate the *American* flowering, John Fisk Allen produced a second elephant folio of *Victoria regia* in 1854 with six full-page lithographs in



Lithograph of the *Victoria regia* waterlily from the elephant folio *Victoria regia*, John Fisk Allen, Boston, 1854, a copy of which is in the Pennsylvania Horticultural Society Library. The giant waterlily was first successfully cultivated and flowered in America in 1851, on the estate of Caleb Cope near Philadelphia.

color by William Sharp of Dorchester, Massachusetts, from plants grown at Salem by Allen. This folio was dedicated to Cope: "To whose zeal in horticulture we are indebted for the introduction to this country of many rare and beautiful plants, and to whom belongs the honor of first cultivating and flowering in the United States, the Great American Water Lily."⁴⁴

Caleb Cope, born in Greensburg, Westmoreland County, Pennsylvania, in 1797, was orphaned as a boy, clerked in a store, and entered his uncle Alfred's shipping business which was engaged in the East India trade.⁴⁵ In 1839 he was chosen a director of the United States Bank while Nicholas Biddle was president, both, we may add, enthusiasts for horticulture. Cope served as president of the Pennsylvania Horticultural Society for ten years, 1841 to 1851. His portrait was completed in ten days by Philadelphia's leading portrait painter, Thomas Sully who altogether executed about 2,000 likenesses. Sully, "the creator of a romantic portraiture of mood, elegant, reflective, tinged with sweetness and melancholy, and immensely popular," was to the United States what Lawrence was in England.⁴⁶

Chester County gave to botany and horticulture not only Humphry Marshall of *Arbustum Americanum, the American grove*, but also David Townsend, commemorated by William Jackson Hooker in the name for the aster-like *Townsendia*, and Josiah Hoopes, author of a pioneer American book on conifers. His *Book of evergreens* [1868], subtitled "A practical treatise on the Coniferae, or cone-bearing plants," was decked in a strong forest-green binding with a goldleaf medallion of the Big Tree. Now if you open the *Book of evergreens* to the description of the "Great Tree of California" (p. 239), which we now distinguish as *Sequoiadendron giganteum*, Hoopes writes as if he had walked in the Mariposa Grove, although he did not venture far from his West Chester home.

There is patriotism in the history of the Big Tree. John Lindley described it in 1853 as *Wellingtonia gigantea*.⁴⁷ Albert Kellogg, botanist of San Francisco, however, was not willing that a California tree should bear the name of a British general, and with "equal impropriety" called it *Washingtonia gigantea; Americus gigantea* had also been proposed anonymously.⁴⁸ *The horticulturist* of 1866 (p. 332) reported this "most astonishing product" of the Mother Lode, "defying the heat and cold, the storms and blasts of three thousand years, and attaining the almost incredible size of ninety feet in circumference, one of the finest specimens was ruthlessly felled," and its bark stripped so as to be reassembled in the East as a public side-show. "For our part, we would give double the price which may be demanded to see the tree, to have one look at the man who could have the heart to put an axe into its noble trunk. No; the government of California should have preserved such a specimen at any cost, even at the expense of a golden fence around it, if no iron was to be had." Who said environmentalists are new fadists? The first Big Tree in the East was planted in 1859 by the Painter brothers at Lima, Pennsylvania, fifteen miles southwest of Philadelphia, the property now known as John J. Tyler Arboretum.⁴⁹

Another conifer in Josiah Hoopes' *Book of evergreens* recalls a little known chapter in American horticulture, that of Robert Fortune's explorations in China and Japan, and his introductions into our gardens.⁵⁰ Fortune brought the endemic Japanese umbrella pine (*Sciadopitys verticillata*) into cultivation in 1861.⁵¹ Five years later Hoopes described and illustrated the umbrella pine (pp. 236-239) on the basis of young plants, perhaps the first planting in the United States, which he saw in Henry Winthrop Sargent's arboretum at Wodenethe, Fishkill Landing on the Hudson, directly across the river from the estate of Andrew Jackson Downing.⁵²

"We often hear of very old plants, and there are a few which reach a century or more of actual life, but the great majority of garden things do not live beyond a [human] generation, and if neglected perish very soon."⁵³ Can we save a garden for the next generation? Yes. Preserving unusual gardens rests with the off-shoots that spring from the old root-crowns. That the oak-leaved hydrangeas at the Bartram gardens today are descendants of those that blossomed two hundred years ago does not diminish the importance of that garden. Gardens, says Sylvia Crowe, are the "link between men and the world in which they live."⁵⁴ We may be hesitant to admit it but let Francis Bacon speak again: "Men come to build stately sooner than to garden finely; as if gardening were the greater perfection."

Notes on sources

1. Darlington, William — *Memorials of John Bartram and Humphry Marshall*. Philadelphia: Lindsay & Blakiston, 1849. Reprinted, with introduction and indices by Joseph Ewan (New York: Hafner Publishing Co., 1967). See pp. 367-368.
2. Bell, Whitfield J., Jr. — For latest biographical accounts, with selected bibliographies of both John and William Bartram, see: *Dictionary of scientific biography* 1: 486-490. 1970.
3. See Note 1, above, for Ewan's introduction, with references, a chronology, and indices to personal names, those of sea captains, and to plant names.
4. Ewan, Joseph — "Plant collectors in America. Backgrounds for Linnaeus." In, Smit, Pieter & Laage, R. J. C. V. ter — *Essays in biohistory*. Utrecht: International Association for Plant Taxonomy, 1970. pp. 19-54. John Bartram's collections are noted on p. 32, biographical references on p. 48.
5. See: *From seed to flower: Philadelphia 1681-1876. A horticultural point of view*. Philadelphia: The Pennsylvania Horticultural Society, 1976. P. 16, for illustrations of four specimens labelled by John Bartram, preserved at the Sutro Library.
6. See: Benson, Adolph B. — *The America of 1750. Peter Kalm's travels in North America*. . . . 2 vols. New York: Wilson-Erickson, Inc., 1937. For 1964 reprint, see that by Dover Publications Inc., New York, N.Y. (in 2 vols.)
A revision of J.R. Forster's English translation of 1770, with an introduction and annotations by Prof. Benson, and with Forster's original footnotes. For Kalm's remarks on Bartram's herbarium see 1: 73-74. For a more recent reprint of Forster's translation see that edited, with new introduction, by Ralph M. Sargent (Barre, Mass.; The Imprint Society, 1972).
For an analysis of background and results of Kalm's entire North American journey, based largely on unpublished diaries and other Finnish documents, see: Kerkonen, Martti — *Peter Kalm's North American journey* (Helsinki; [Finnish Historical Society], 1959). Includes many references to Bartram's association with Kalm and several of Kalm's opinions of Bartram. The frontispiece reproduces for the first time (in a book) the recently discovered portrait of Kalm.
7. See: Benson, *op. cit.* pp. 61-62. [Citation in Note 6.]
8. At the Henry E. Huntington Library, San Marino, California.
9. For the story of the Scythian lamb see: Tryon, Alice F. — "Vegetable lamb of Tartary." In, *American Fern Journal* 47: 1-7. 1957.
Edwards interpreted the fern rhizome as a "sort of moss." For notes on Edwards' relations to the Bartrams see: Stearns, Raymond Phineas — *Science in the British colonies in America*. Urbana, Ill.: University of Illinois Press, 1970. Pp. 521-524.

10. See: Berkeley, Edmund & Dorothy Smith — *Dr. Alexander Garden of Charles Town*. Chapel Hill, [N.C.]: University of North Carolina Press, 1969. Pp. 170-174, for an extended account of William Young, Jr.

The origin of the French and only known edition of Young's *Catalogue* (1783) remains undetermined.

11. Joseph Banks' papers, National Library, Canberra, A. C. T.

12. For a documented biographical sketch of Marshall see Ewan's preface to Marshall, Humphry — *Arbustrum Americanum: The American grove, or an alphabetical catalogue ...* [Philadelphia: Printed by Joseph Crukshank, 1785]. Reprinted edition: New York, Hafner Publishing Co., 1967.

For a chronology of Marshall, see that by Ewan in the Hafner reprint (1967) of Darlington, William — *Memorials of John Bartram and Humphry Marshall* (1849). Details in Note 1 above.

13. See: Stetson, Sarah P. — "William Hamilton and his 'Woodlands.'" In, *Pennsylvania Magazine of History and Biography* 73: 26-33. 1949.

14. Ewan, Joseph — "Bernard M'Mahon (c. 1775-1816), pioneer Philadelphia nurseryman, and his *American gardener's calendar*." In, *Journal of the Society for the Bibliography of Natural History* 3: 363-380. 1960.

M'Mahon's receipt reproduced as pl. 3.

15. Betts, E.M. — "Thomas Jefferson's garden book 1766-1824." In, *Memoirs of the American Philosophical Society* 22:704 pp. 1944. see p. 328.

16. L [andreth, David filius] — [Review] "Reid, Mayne: *The plant hunters. ...*" *The Horticulturist* 13: 254, 257. 1858.

Pursh's role in M'Mahon's *Calendar* is not generally noticed (pp. 255-257). Landreth also provides notes on John Lyon, Thomas Nuttall, et al.

16a. "Several species of tropical legume trees were promptly recognized by the Spanish and Portuguese as similar to costly Old World dyewoods. The old name *brasil* was transferred to a New World species [*Haematoxylon brasiletto*] and then to a region where it grew." Jonathan D. Sauer in *First Images of America*, edited by Fredi Chiappelli (Berkeley, University of California Press, 1976). Pp. 817-818.

17. Jackson, Donald — *Letters of the Lewis & Clark Expedition with related documents, 1783-1854*. Urbana, Ill.: University of Illinois Press, 1962. Pp. 170-172.

18. Betts, E.M. — *Op. cit.* p. 363 [See Note 15, above.]

19. Teste Elbert J. Little, Jr., U.S. Forest Service, *in litt.* to J. Ewan dated 25 Febr. 1975.

20. Ewan, Joseph — [Report] "A survey of the Benjamin Smith Barton papers in the library of the American Philosophical Society." *American Philosophical Society Year Book*. 1973: 569-571. 1974.

21. The priced *Catalogue* constitutes a census of American garden subjects and carries references to John Lyon, among others. A photocopy is in the Ewan library.

22. Pages 68-69. The 1832 *Catalogue* is more than a reprinting of the 1824 edition.

23. Ewan, Joseph & Nesta — "John Lyon, nurseryman and plant hunter, and his journal, 1799-1814." In, *Transactions of the American Philosophical Society* 53(2): 1-69. 1963. For reproduction of the *Catalogue*, see pp. 56-57.

24. Guilding, Lansdown — *An account of the botanic garden in the Island of St. Vincent, from its first establishment to the present time*. Glasgow: 1825. Reprint edition: Forge Village, Mass.: Murray Printing Co., for the Arnold Arboretum, 1964.

25. See note 16.

26. Sellers, Charles C. (ed.) — “Catalogue of portraits and other works of art in the possession of the American Philosophical Society.” *Memoirs of the American Philosophical Society*, vol. 54, pp. i-vii, 1-173. 1961. See p. 104.

27. Nuttall's spelling of Wisteria was surely intentional. For example, there was the precedent of Linnaeus' rendering Plumier, *Plumeria*, and Sweert, *Swertia*, for euphony. Wistar's rule of health deserves notice: “keep the mind in a quiet and tranquil state . . . in short . . . do nothing that is useless. In this mode of conducting ourselves we may better enjoy life, and prolong it until the marrow of bones becomes bone — and finally go to sleep an everlasting sleep” (Ex: Sellers, Charles C. — *Charles Willson Peale* New York: Charles Scribner's Sons, 1969. P. 385).

28. See Joseph Jackson, in *Dictionary of American biography* 11: 486. 1946, for details of Mease's multifarious activities. His correspondents ranged from Thomas Jefferson to William Baldwin. Rodney H. True, commented on Mease as “one of the most steadfast friends in the Society's history.” (See: *Memoirs of the Philadelphia Society for Promoting Agriculture* 6: 19, 21. 1939. Note: vol. 5 appeared in 1826!).

29. J.M. [Mease, James] — “Account of the dimensions of American trees by John Pearson of Darby.” In, *Memoirs of the Philadelphia Society for Promoting Agriculture* 1: 176-182. 1808.

Some basis for the suggestion that Mease is the author of *Gleanings* (Philadelphia, 1803) is the reference to Fothergill (p. 114), and to okra (p. 231).

29a. *Gleanings from the most celebrated books on husbandry, gardening, and rural affairs*, interspersed with remarks and observations by a Gentleman of Philadelphia, published in Philadelphia by James Humphreys, 1803, from the London second edition of 1803, also anonymous.

30. For the latest account of Mrs. Phelps see Frederick Rudolph, in *Notable American Women* 3: 58-60. 1971.

31. The Humboldt chart (frontispiece to ed. 1) was singularly omitted from subsequent editions. His classification of vegetation is mentioned by her on p. 203 (1829), [ed. 3 (1832), p. 295] followed by a synoptical table based on Humboldt, whose “remarks on vegetables, as a criterion of climate, are original and interesting” (p. 321).

B.S. Barton's *Elements of botany* is noticed as a “large work containing much that is interesting in the physiology of plants” (p. 322, cf. also p. 62). “Different sorts of strawberries” are mentioned by Mrs. Phelps, ed. 1, p. 226, but omitted from later editions. The silk cotton tree (*Ceiba pentandra*) on the other hand, is reported in ed. 3, p. 248, but not in the first edition.

32. Rubens Peale. The portrait shows him holding the geranium; handicapped by poor eyesight he could not become a successful painter in a family of painters. He attended botany classes at the University of Pennsylvania in 1804 — were they B.S. Barton's classes? — and kept a garden in Germantown before he opened his Baltimore museum.

Watermelon history is told in *Sturtevant's notes on edible plants*, edited by U.P. Hedrick (Albany: J.B. Lyon Company, 1919) pp. 169-172. Note that its long established name of *Citrullus vulgaris* is now replaced by *C. lunatus*. B. M'Mahon, in *The American gardener's calendar* (Philadelphia: B. Graves, 1806), pp. 581-582, listed four watermelon varieties. S.L. Mitchill once introduced C.W. Peale as “the father of natural history in America” [see: Charles C. Sellers — *Charles Willson Peale*. (New York: Charles Scribner's

Sons, 1969), p. 384]. Raphaelle Peale's "Blackberries" is illustrated in the *Smithsonian* 7(1); 44. 1976. William H. Gerdts characterized Raphaelle Peale as one of the two most important still life painters in America [see: Brindle, John V. & Secrist, Sally — *American cornucopia. 19th century still lifes and studies.* (Pittsburgh, Pa.: Hunt Institute for Botanical Documentation, 1976). Pp. 4-5].

33. See Loudon's *Gardener's Magazine* ... [London] 8: 277-278. 1832.
34. Hibbert and Buist's *American flower garden directory*; ... (Philadelphia, Pa.: Adam Waldie, 1832) issued following their buying trip to England, is illustrated in *From seed to fruit* ... (1976), pp. 70-71, from the copy in the Pennsylvania Horticultural Society Library [see Note 5 for citation].
35. John Lindley described *Salvia fulgens* Cav. from plants grown in the gardens of the Royal Horticultural Society, from seed collected above 8,000 feet in the mountains of Mexico by George John Graham (see: *Edwards' Botanical Register* 16: pl. 1356. 1830).
36. The travels of David Douglas' third trip are detailed in McKelvey, Susan Delano — *Botanical exploration of the Trans-Mississippi West, 1790-1850.* (Jamaica Plain, Mass.: The Arnold Arboretum of Harvard University, 1955), pp. 393-427. For her report of his earlier trips to western North America, see *op. cit.* pp. 299-334.

The California poppy was not first collected in the Columbia River region and introduced in 1825 as erroneously related by William Morwood in his *Traveller in a vanished landscape. The life and times of David Douglas, botanical explorer* (New York: Clarkson N. Potter, Inc., 1973). Other lapses are noted in Ewan's review, in *Plant Science Bulletin* 20(1): 19. 1974.

37. Archer, Mildred — *Natural history drawings in the India Office library.* (London: H.M. Stationery Off., 1962). P. 60. — a Catalogue, pp. 71-102.
38. See: B.S. Barton papers, in the John R. Delafield Collection at American Philosophical Society.

William Darlington sent a copy of his *Flora Cestrica* (1837) to Roxburgh at Calcutta (see: William Griffith, *Report on the Hon'ble Company's botanic gardens, Calcutta.* Calcutta: 1843).

39. George Ord, letter dated 21 July 1847, to Wm. Darlington. In, Darlington papers, 5: 140. (At New York Historical Society.)
40. For the latest estimate of William Darlington see that by Ewan in the *Dictionary of scientific biography* 3: 562-563. 1971.
41. W.J. Hooker related the fascinating story of the discovery of *Victoria* in *Curtis's Botanical Magazine* ser. 3, vol. 3, pp. 1-16, pls. 4275-4278. 1846. Quotation from p. 2.

For an account of the change from the widely known name *Victoria regia* to the correct *V. amazonica*, see Lawrence, G. H. M. — "Nymphaeaceae," in *Gentes Herbarum* 8: 30-31. 1949.

42. Blunt, Wilfrid — *The art of botanical illustration.* (London: Collins, 1950). P. 226. [The latest edition is published by Collins-World, 1970.]
43. Caleb Cope's Springbrook in the years before the arrival of *Victoria* is described in *The Horticulturist* 3: 411. 1849. That account was reprinted in Boyd, James — *A history of the Pennsylvania Horticultural Society. 1827-1927.* (Philadelphia: Printed for the Society. 1929.) Pp. 446-450; for a sketch of Cope see p. 387. The panic of 1857 forced the sale of Springbrook (see: Edna Yost in *Dictionary of American biography* 4: 420. 1946).
44. Both Fitch & Hooker's work of 1851 and Allen's of 1854, handsome folios, may be seen in the Pennsylvania Horticultural Society library, the last is a

presentation copy from the author. Their citations are:

Fitch, John Nugent & Hooker, William Jackson — *Victoria regia; or illustrations of the royal water-lily ...* By W. Fitch; with descriptions by Sir W.J. Hooker. London: Lovell & Reeve, 1851.

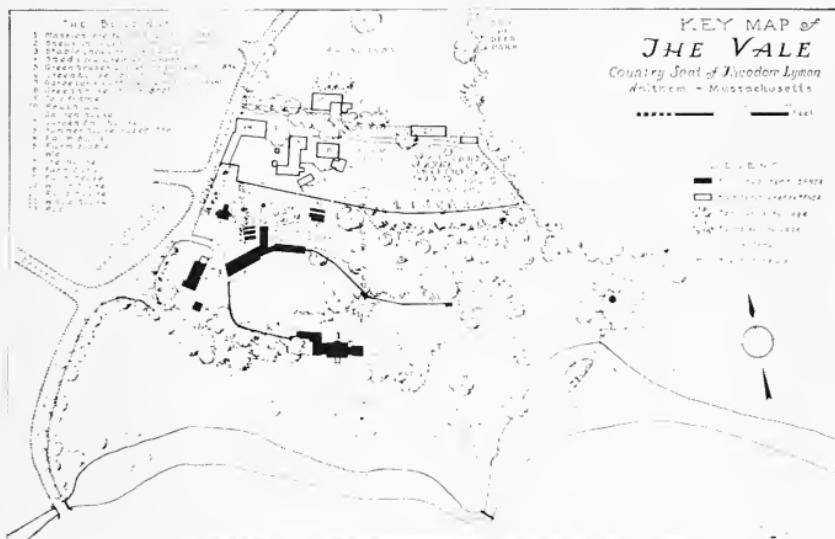
Allen, John Fisk — *Victoria Regia; or, the great water lily of America. With a brief account of its discovery ...* With illustrations by William Sharp, ... Boston, Mass.: Dutton & Wentworth, 1854.

45. Alfred Cope's eldest son, Edward Drinker Cope (1840-1897), was the famous paleontologist whose bitter rivalry with Prof. O.C. Marsh (1831-1899) of Yale was a cause celebre in dinosaur circles.
46. Richardson, Edgar Preston — *Painting in America; the story of 450 years.* (New York: Thomas Y. Crowell, 1956). P. 153. For Sully's portrait of Cope, see: Boyd, *History ...* (see Note 43), opposite p. 78.
47. For other facets of the *Sequoiadendron* Story see Ewan, Joseph — "William Lobb, plant hunter for Veitch and messenger of the Big Tree," *University of California Publications in Botany* 67: 1-36. 1973.
48. That Hoopes was aware of the obscure name "Americus gigantea" — though he misspelled it — is notable. The name was published in an anonymous 8-page pamphlet by a New York showman in 1854. For illustration of the title-page, see: Farquhar, Francis P. — *Yosemite, the big trees and the High Sierra; a selective bibliography.* (Berkeley: Univ. of California Press, 1948) P. 8.
49. The Painter brothers maintained the arboretum from 1825 to 1875 see: Wyman, Donald — "John F. [sic] Tyler Arboretum," in his "The arboreta and botanical gardens in North America," p. 448. In, *Chronica Botanica* 10: 397-481. 1947. For another description of the present Tyler Arboretum see, McGourty, Frederick — "Lima. John J. [sic] Tyler Arboretum," in his "American gardens — a traveller's guide," p. 36. In, *Plants and Gardens* new ser. 26(3): 1-105. 1970.
50. See: Gardener, William — "Robert Fortune and the cultivation of tea in the United States." In, *Arnoldia* 31(1): 1-18. 1971. Gardener related also the introduction of other plants, pp. 16-18. Charles Darwin noticed Fortune's yellow camellia and scribbled a note in the margin of his copy of *Gardener's Chronicle* for 1859, p. 807. His set of the journal is in the library of the Cambridge University Botanic Garden.
51. Cox, Ewan H.M. — *Plant-hunting in China.* (London: Collins, 1945) P. 91. Reprint edition: (Barre, Mass.: The Imprint Society, n.d. [ca. 1973]).
52. Henry Winthrop Sargent, first cousin of Ignatius, the father of Charles Sprague Sargent (1841-1927), was an avid horticulturist who at 31 "went into semi-retirement and devoted his time to horticulture while keeping one eye on his investments" (see: Sutton, Stephanne Barry — *Charles Sprague Sargent and the Arnold Arboretum.* Cambridge, Mass.: Harvard Univ. Press, 1970. Pp. 12-17, with Winthrop's portrait on p. 16). C.S. Sargent wrote of observing *Sciadopitys* in Japan, in his *Forest flora of Japan.* Boston: Houghton, Mifflin and Company, 1894. Pp. 77-78.
53. Lockwood, Alice G.B. — *Gardens of colony and state.* 2 vols. New York: Charles Scribner's Sons for The Garden Club of America, 1931. Vol. I., p. 14.
54. Quoted as preface in Lees, Carlton B. — *Gardens, plants and man.* Englewood Cliffs, N.J.: Prentice-Hall, 1970.

Sharing the Wealth: American Plants in the English Landscape

Diane Kostial McGuire

A subject that has interested me very much is the exchange of woody plants between England and America, especially the use of American trees and shrubs in Britain. We are so much more aware of English influences in this country than we are of the reverse. My interest in the subject arose from my work as a landscape architect at The Vale in Waltham, Massachusetts.



Plan of the park and the gardens of The Vale, Waltham, Mass.

When first laid out, the approach to the house was by a long drive that crossed between the upper and lower ponds on a triple-arched white granite bridge that must have recalled similar features in the paintings of Claude Lorrain (1600-1682). This was removed in 1833, and gone now, too, are the deer park and the summerhouse from which one might have had a view of the Middle Pond. But the Peach Wall is still in place, and a few venerable oak and beech trees survive, as do of course Theodore Lyman's greenhouses, begun about 1800, and now probably the oldest still in use in the United States.

Courtesy, *The Society for the Preservation of New England Antiquities*.

The Vale, a property of 300 acres, bought by Theodore Lyman in 1793, was laid out in the English style by an English gardener named Bell. It included beeches, box hedges, a deer park, a brick peach wall, a greenhouse (built in 1793), a tea house in the style of Chippendale designed by Samuel McIntire of Salem, Massachusetts, and a house also by McIntire.

Theodore Lyman, an ardent horticulturist, imported the 'Hamburg' grape from the great vine at Hampton Court, near Richmond, Surrey, England. He established a hillside section of The Vale adjacent to the ornamental gardens, as an "American Woodland," where specimen trees native to northeastern America predominated. He did this in the English manner with a long avenue of White Pine (*Pinus strobus*) cut diagonally across the hillside. This recognition and appreciation of the value and usefulness of our native plants in the cultivated landscape had already begun in Europe.

During travels in England I noticed that our American trees were used generally in two distinct ways within the English ornamental gardening tradition: as a part of a collection of botanical curiosities (an important and distinct aspect of the English horticultural tradition), with the emphasis on rarity or simply on the unusual; or to achieve a somewhat exotic design effect, not at all as we would use them in this country. In other words, the English used our native plants in a manner and with an aesthetic appreciation that differed considerably from ours.

As a landscape architect with a primary interest in the aesthetic relationship between man and the natural world, I began to look more deeply into this very exciting subject. My research led me into a more thorough study of eighteenth century English landscape design. Not only was this the era of the "golden age of botany," but it was also a time of change in design concepts. Considerable creative energy resulted in the emergence of the English Landscape style, one which not only changed the physical aspect of the English countryside but, inevitably, so influenced Europe as to alter in Italy many of the beautiful formal gardens of the sixteenth and seventeenth centuries — all to meet an overwhelming desire to be in the English "fashion." This movement eventually became the inspiration of our nineteenth century effort to establish vast urban parks.

It has been true generally, at the start of the eighteenth century and even today, that the English identify with their native trees. Moreover, they regard "native trees" as synonymous with broad-leaved trees, and not only broad-leaved trees but majestic, broad-leaved trees.

The interest in wild, craggy scenes of mountain torrents and contorted trees was part of the romantic ideal of the nineteenth century whereas in the eighteenth the ideal was that of the broad pastoral landscape, whose horizontal lines were emphasized by broad sweeping expanses and protective sheltering trees. The French landscape painter Claude Lorraine (i.e., Claude Gelle) (1600-1682) worked in Rome after 1630 and his work was much appreciated and sought after by English travellers who went to Rome to study and enjoy classical antiquities, and to see the work of contemporary painters.

The interest in landscape painting coincided with the publication of John Evelyn's *Sylva* or "A Discourse on Forest Trees" (Ed. 1, London, 1664), in which he urged re-forestation on a grand scale. English painters relinquished their earlier architectural models, derived from classical Greek and Roman tradition, and began to develop their own landscape style, in which spaces were defined and articulated by the landscape itself, with plants — not architecture — as the dominant element. Among the plants, the broad-leaved trees were the most important and expressive of mood.

William Kent (1684-1748), architect, landscape architect, and a painter himself, was influential in changing the appearance of the English landscape. At the beginning of the eighteenth century he broke with the tradition of planting formal avenues of trees and, as may be observed in his sketches, began to plant clumps of trees, clumps of similar varieties, not the mix that we have come to identify with the work of the nineteenth century.

The traditional symmetrical geometric style, with its emphasis on architecture, had its last and most spectacular expression in the axial layouts of Louis XIV and was dismissed as uninteresting and unnatural insofar as plants were not allowed to assume their natural shape and distribution.

A fundamental part of this change of attitude by the English was an increased understanding and appreciation of the natural forms and groupings of plants. The layout of the English garden during this period endeavored not only to group plants in an aesthetically pleasing way but to incorporate in the planning practical

considerations of estate management. John Evelyn, in his *Sylva*, consistently stressed the planting of trees as the major element in the development and balanced management of estates. This "balanced management," as it resulted in plant groupings and distribution, was aesthetically "correct" but more important it was laid out according to ecological principles. These eighteenth century landowners had a keen understanding of the workings of nature and how these could be manipulated and used to the best advantage.

At the beginning of the eighteenth century the English were interested not only in the wealth of new plant material which was becoming available (particularly from the New World) but were becoming increasingly interested in plants for their own sake. A "scientific bias" evolved and led many English gardeners to become collectors. This often resulted in such a hodge-podge that one could not see the gardens for the plants. It was a movement against order, regularity, and frequently without design which simply satisfied the acquisitive collecting instinct. The reconciliation of these two different horticultural interests is expressed in the development of English landscape design during this important historical period — the creation of gardens laid out to satisfy a native taste.

It was the attitude of people such as William Kent towards plants which provides us with one of the keys to the English landscape garden. The Italian garden of the Renaissance provided a setting for the drama of man (the early prints depict them as stage settings). The French garden of the seventeenth century provided a setting for display, for polite social intercourse and court intrigues. In both of these garden styles plants were a part of the architectural framework. In the English landscape garden it is the plant that is all important. The ideal of the English landscape garden is an arrangement of plants perfectly displayed in an idealized setting transcending our everyday experience and common perception.

Let us now consider four eighteenth century English gardens whose design reveals attitudes of the time toward plants and particularly newly found plants from the New World.

1. *Rousham*, beside the River Cherwell in Oxfordshire, midway between Banbury and Oxford.

Here stands the major work by William Kent, the noted English painter, architect, sculptor, and landscape gardener; an assignment executed for Lt. Gen. James Dormer (1679-1741). It is a garden essentially completed in 1740, when work ceased with Dormer's death.

Horace Walpole described Rousham, and wrote:

The whole is as elegant and antique as if the Emperor Julian had selected the most pleasing solitude about Daphne to enjoy philosophic retirement.

Design features at Rousham are coordinated to emphasize various prospects where, in each instance, a picture is framed or defined:

Tall evergreen trees, surrounded by meadow grass;

A serpentine rill, snaking through the branches overhead;

The whole bordered on either side by groves of broad-leaved trees with evergreens intermixed to give variety and to evoke the atmosphere of the classical world.

2. *Studley Royal* in Yorkshire, designed and built between 1715 and 1730, takes advantage of the view of the great ruins of Fountains Abbey as the focal point of a spectacularly effective view combining both natural and picturesque elements.

Studley Royal was inherited in 1699 by John Aislabe (1670-1742), the notorious Chancellor of the Exchequer. He was briefly imprisoned in the Tower for a financial scandal in which he was implicated, and after his release withdrew to Studley and devoted his energies to the improvement of his estate. There his designs display much of the grand scale and visionary boldness that distinguished his financial dealings and brought about his downfall and disgrace. Hillsides are richly planted with evergreens for depth of color, deciduous trees for texture, and some unusual exotics, such as magnolia, for their glossy reflectiveness, these surrounding a broad expanse of gently contoured rolling lawn, encircling several gracefully shaped ponds. The brilliantly sunlit lawn and ponds provide a sharp contrast to the rich tapestry of the surrounding hillsides.

3. *Powis Castle*, near Welshpool in Montgomeryshire, Wales.

The Herbert family, powerful for a time among the Jacobites, has lived here for generations. It passed through marriage to Edward Clive (1754-1834), the Earl of Powis and one time Governor of Madras, who was a son of Lord Clive, founder of the Empire of British India.

The garden at Powis Castle was redesigned under the aegis of William Herbert during the period between 1700 to 1730, and remains highly regarded as an important garden of the time. A leader of Britain's Roman Catholics, Herbert was thoroughly familiar with estates outside Rome and to the north. His admiration for these Italian landscapes undoubtedly influenced his work at Powis where he created in effect an Italian villa with a baroque terraced garden, descending terraces, an orangery and an enclosed kitchen garden.

From the castle one may look across at the Wilderness, a collection of exotics set among a large grove of English Oaks. American plants are represented in this collection by the Silver Maple (*Acer saccharinum*), Southern Catalpa (*Catalpa bignonioides*), Tulip Tree (*Liriodendron tulipifera*), American Sourwood (*Oxydendron arboreum*), Western Yellow Pine (*Pinus ponderosa*), Douglas Fir (*Pseudotsuga taxifolia*), Giant Redwood (*Sequoiadendron giganteum*), Silk-tassel (*Garrya elliptica*), and Mountain-laurel (*Kalmia latifolia*).

4. *Stourhead*, in Wiltshire, was a bleak spot with a fine Palladian manor house when Henry Hoare the younger (1705-1785) inherited it from his father. From 1740 to 1772, Hoare developed here one of the most spectacular garden plans in the style of William Kent, whose work at Rousham is noted above.

The garden epitomized the English school and was replete with such strong architectural features as the Temple of the Sun, the rustic cottage, Alfred's Tower, the Temple of Flora, a grotto, and a lake. Today, a National Trust property, it is most controversial because of the alteration of the original concept due, largely, to the heavy plantings of rhododendrons around the lake. The original plans called for a progression from light to dark; from the lake across a sunlit grassy meadow to the rich depths of the woods behind as described at Studley Royal.

By 1791, the arboretum was comprised largely of exotics, of which the following came from America:

Box Elder (*Acer negundo*)

Striped Maple or Moosewood (*Acer pensylvanicum*)

Red Maple (*Acer rubrum*)
 Silver Maple (*Acer saccharinum*)
 Sugar Maple (*Acer saccharum*)
 Southern Catalpa (*Catalpa bignonioides*)
 Fringetree (*Chionanthus virginicus*)
 Mountain Dogwood (*Cornus nuttallii*)
 Silverbell (*Halesia carolina*)
 American Sweetgum (*Liquidambar styraciflua*)
 Tulip Tree (*Liriodendron tulipifera*)
 Sweet Bay (*Magnolia virginiana*)
 American Linden or Basswood (*Tilia americana*)
 American Elm (*Ulmus americana*)

American trees in English landscapes.

Large open areas provided space for massing the evergreen and the broad-leaved deciduous trees. Specimen trees were used singly in these smaller areas or in avenues or small groupings. Europe's landscape gardeners of the seventeenth and eighteenth centuries introduced as exotics many American native trees. A chronological account of the more important introductions to England includes the following:

- 1630 Sassafras (*Sassafras albidum*) is found in a few gardens in southern England. Although much prized and early called the three-lobed Bay Tree, it was rare as late as 1800 because in England it produced neither sucker growth nor fruit. Virtually all specimens arrived as plants from central Atlantic ports.
- 1640 Black Locust (*Robinia pseudoacacia*), one of the first American trees sent to Europe by Jean Robin (1550-1629) herbalist, to Henry IV of France. By 1600 he had a garden in Paris of more than 1,000 kinds of plants and first grew this species there in 1606 from seeds received from Canada. It was introduced to England from Virginia in 1640.
- 1650 London Plane Tree (*Platanus acerifolia*). This well known tree of urban parks is a hybrid which arose in Spain or Southern France about 1650, resulting from a cross between the Oriental Plane Tree (*Platanus orientalis*) and our native American Buttonwood (*Platanus occidentalis*). It is occasionally known in England as *Platanus hispanica* because of its origins. [Ed. note: *P. acerifolia* 'Hispanica' is a cultivar with 5-lobed leaves a foot across, with toothed lobes.] The first trees planted in England at Ely (in Cambridgeshire) and at Barnes (in Surrey) are as magnificent and healthy today as are the more famous specimens planted in Berkeley Square, London, in 1758.
- 1650 Tulip Tree (*Liriodendron tulipifera*), a majestic tree characterized by both its foliage and large cup-shaped flowers, is prized as a landscape subject for its fresh green foliage turning clear light yellow in autumn and for its multitude of candelabra-like seed pods that persist after the leaves fall. It was introduced from Virginia about 1650 and for more than a century was known in England as a Poplar and had the Latin generic name *Tulipifera* (not until 1753 was it renamed *Liriodendron*). By 1768 seed was imported annually to England from America in large quantities and the tree was then used frequently in gardens and parks into the northern Midlands. One conspicuous planting is at Stourhead,

in Wiltshire. So important was the tree by 1768 that Philip Miller devoted three folio columns to it in his *Dictionary*.

1656 Black Walnut (*Juglans nigra*), called Black Virginia Walnut in eighteenth century England, where it remained uncommon for a century and a half after its introduction. Early specimens did well in the Thames valley.

1705 White Pine (*Pinus strobus*), better known throughout England as Weymouth Pine and named for Lord Weymouth [Sir Thomas Thynne, (1640-1714)], English ambassador and statesman, who introduced it at Longleat, Kent. Another early and substantial planting was made by the Third Duke of Argyle [Sir Archibald Campbell (1682-1761)] at Whitton near Hounslow, outside London.
Other American pines of later introduction which fared well in the English climate were:
Sugar Pine (*P. lambertiana*) of the west coast, introduced by David Douglas (1798-1834) in 1827. Today it is rare in England.
Western Yellow Pine (*P. ponderosa*), also introduced by Douglas (1828), is one of the species best suited to England's climate. Powis Castle, has one of the earlier plantings of it.
Monterey Pine (*P. radiata*) of coastal southern California came to England in 1833 and is now an important timber tree in southwestern England and in Ireland.

1725 Silver Maple (*Acer saccharinum*) was planted widely after its introduction and specimens were prized on most of the large estates. It continues to be frequent and is one of the best maples in Europe.
The Sugar Maple (*Acer saccharum*), introduced in 1735, is less frequently grown. Large trees occur at Westonbirt, in Gloucestershire, but England's climate fails to produce in them the vivid fall color so characteristic in New England.

1726 Southern Catalpa (*Catalpa bignonioides*), known also from the shape of its pods as the Indian Bean Tree, and by some as Trumpet-flower Tree, is frequent in parks, city-squares, streets, and gardens of southern England. England's first plants probably came from seed brought from Virginia in 1726 by Mark Catesby (1674-1749).

1734 Bull Bay or Southern Magnolia (*Magnolia grandiflora*), "commonly called Greater Magnolia" (Miller, 1768), much sought for its dark green glossy evergreen foliage, was early grown in the warmer parts of southern England. Introduction was probably from South Carolina and the first trees introduced flowered in 1762.
Miller (1768) reported,
"There were a great number of young plants in England before the year 1739; but a great part of them were destroyed by that severe winter, and since then, there have been few good seeds sent to England so that ... the demand for them of late has greatly increased their value."
Late in the eighteenth century a clonal selection named 'Exmouth' (syn. *M. exoniensis*) was described and distributed. The plants have a narrower foliage, flower earlier and, when free-standing (as sometimes in England and Ireland) are of conical habit. Because of the frost-tenderness of the species, this cultivar is grown most commonly espaliered against walls.
The Marquis of Blandford established in 1800, at his White Knights



Bull Bay or Southern Magnolia (*Magnolia grandiflora*) probably introduced from South Carolina and grown in the warmer parts of southern England, as illustrated in *The gardeners dictionary*, 1760, by Philip Miller.

Tulip Tree (*Liriodendron tulipifera*), one of the New World plants displayed in eighteenth century English gardens. William P.C. Barton, *Vegetable materia medica*, V. 1, 1825.

estate, Reading, a famed magnolia wall 145 feet long and 24 feet high, espaliered with 22 specimens of this cultivar.

Much earlier, in 1687, John Banister (1650-1692) sent from Virginia seeds of the Sweet Bay (*Magnolia virginiana*) [syn. *M. glauca*] to Henry Compton (1632-1713) Bishop of London. Plants were recorded in 1688 as growing in the Bishop's garden at Fulham. These delicate plants with very fragrant flowers were esteemed by garden connoisseurs of the day as tokens of long-sustained affluence and gracious gardening, to be "conspicuous but to manage an air of frailty".

By 1768 the largest assemblage of the species in England was reported by Miller to be at Workshop Manor, Nottinghamshire, an estate of the Duke of Norfolk.

1736 Cucumber Tree (*Magnolia acuminata*), discovered by John Bartram, uncommon in England, was noted by Miller to be "very rare" there in 1768.

Canadian Hemlock (*Tsuga canadensis*), although amenable to acid soil areas, is an infrequently planted evergreen in England. Miller wrote of it (1768): "This tree does not thrive well in any part of England, ..."

1750 Sour Gum (*Nyssa sylvatica*), while prized for its brilliant autumn foliage proved difficult to propagate and to transplant, and several decades passed before it was well known (usually as *N. aquatica*), in the large estate gardens in southern England. A notable planting in Sheffield Park, Sussex, dates from 1909.

1773 Franklin Tree (*Franklinia alatamaha*) [syn. *Gordonia alatamaha*] was introduced to England by John Bartram (1699-1777). Discovered by



Franklin Tree (*Franklinia alatamaha*) introduced to England by John Bartram, from a drawing by William Bartram in the British Museum collection. *William Bartram: botanical and zoological drawings 1756-1788*, American Philosophical Society, 1968.

Courtesy of the British Museum and the American Philosophical Society.

him in 1765, Bartram first considered it to be *Gordonia pubescens* but separated it from that genus and gave it its present name. The tree grows well on English limestone soils. Unlike the true *Gordonia* (the Loblolly Bay), *Franklinia* produces solitary flowers in the autumn.

1824- A selection of valued trees introduced from the Pacific northwest by
1829 David Douglas, includes:

Giant Fir (*Abies grandis*) in Scotland are colonies known to have attained heights of one hundred and sixty feet in a fifty year span.

Douglas Fir (*Pseudotsuga taxifolia*), introduced in 1824 and now common in England, is well adapted to the English climate when away from polluted atmospheres of the larger cities.

A specimen of unknown age, close by a woodland pool on the estate of the Duke of Atholl, Dunkeld, Scotland, is 173 feet tall. Another, at Powis Castle, is 181 feet tall.

1827 Strawberry Tree (*Arbutus menziesii*), known also as Madrona in its native California, is a broad-leaved evergreen prized for its striking mottled smooth bark, showy panicles of white flowers, and its orange to red fruit.

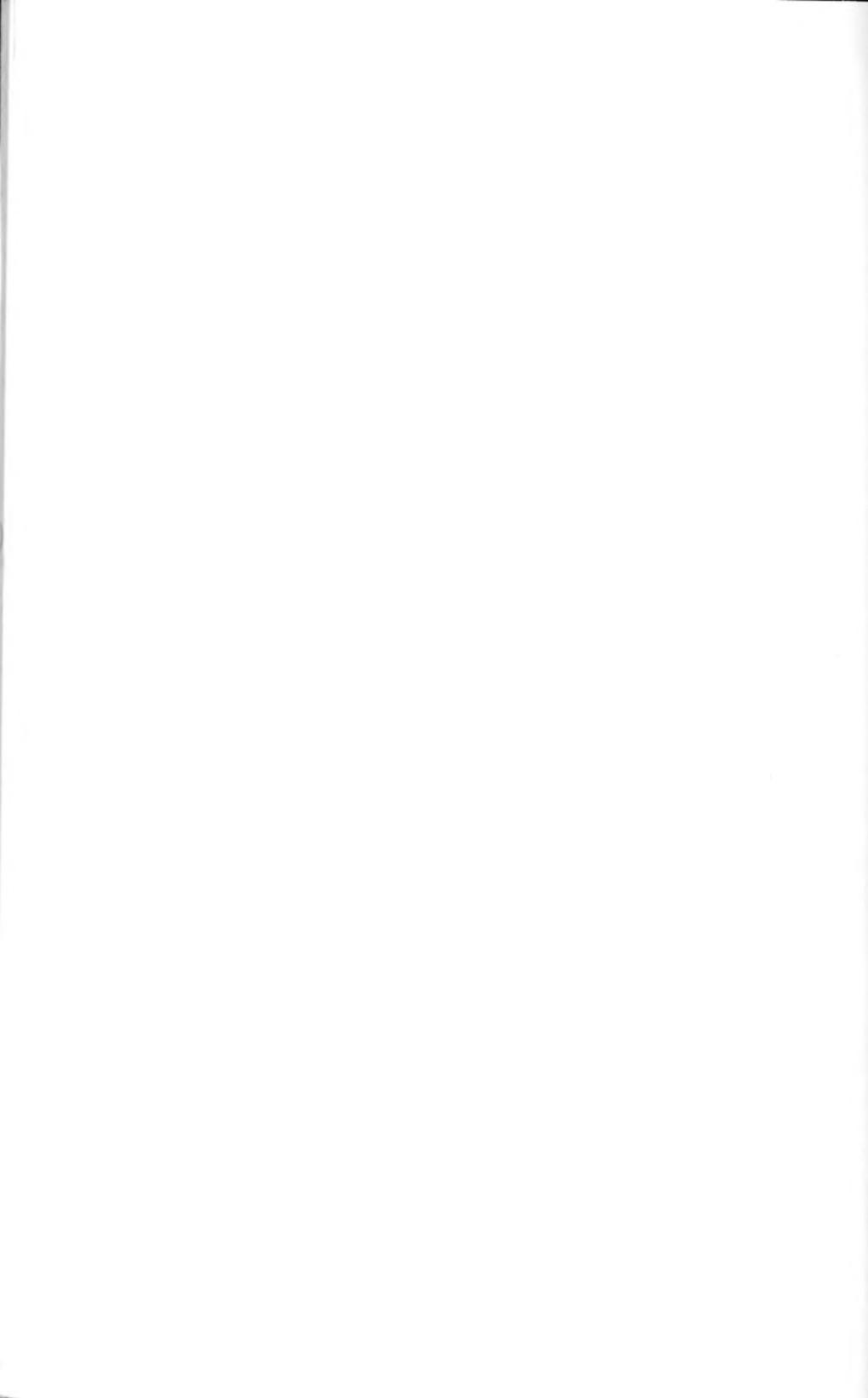
Introduced by Douglas, it remains infrequent in English gardens but is found on the larger more southern estates. A notable planting is to be seen at Lord Aberconway's estate, Bodnant, near Tal-y-cafn, Colwyn Bay, North Wales.

1843 Coast Redwood (*Sequoia sempervirens*), introduced via Russia, is less popular and more difficult to grow in England than is the Giant Redwood. Markedly affected and inhibited in growth by strong prevailing winds, it grows best in protected valleys in southwest England.

1853 Giant Redwood (*Sequoiadendron giganteum*), discovered in 1841 by the British botanical explorer, John Bidwell (1815-1853), near the Sacramento River, and introduced to England by the intrepid William Lobb (1809-1863), then a collector for James Veitch. His seed came from the Calaveras grove in California, was germinated in August 1853 at Gourdiehill in Perthshire, and the seedlings sent to Veitch's nursery in Exeter in December.

John Lindley named it that year, *Wellingtonia* in honor of Arthur Wellesley, First Duke of Wellington (1769-1852), but was unaware that the Swiss botanist Carl Meissner had used the name earlier (1840) for an unrelated genus in the Sabiaceae. The following year (1854) it was placed in the genus *Sequoia* where it remained until 1939, when the American botanist, John Buchholz (1888-1951) demonstrated it to merit recognition as a genus apart from *Sequoia* and renamed it *Sequoiadendron*.

Today, large trees of the Giant Redwood are seen lining avenues in numerous English, Welsh, and Scottish estates. One of the tallest specimens in England, in Devonshire, stands 165 feet high.



Science Enters the Garden

Charles E. Hess

In recent years, there has been a degree of disenchantment with the impact of science and technology on our society. A review of the history of horticulture and gardening enables one to appreciate the positive contributions that science has made to our understanding of plant growth and development, the influence of the environment, and how the visual and physical environment has been enhanced through the use of plant materials. Let us trace a number of these developments, observe changes they have made on gardening, and consider some of the potential contributions science may have in store for us.

Plant explorers and collectors made early significant contributions to gardening by bringing a wealth of plant materials from throughout the world. Collections of these plants in arboreta and elsewhere made it possible to observe plant growth, hardiness, adaptability to a variety of climatic and soil conditions, and ability to be propagated. From these collections the plants were widely disseminated. Through an understanding of the variations in the plant's ability to survive in different environments and by recording the weather conditions in different regions of the country, it has been possible to establish hardiness zones and maps, and to predict which plant materials will grow successfully in these zones. It has been possible also to observe special changes, such as mutations or the formation of witches brooms.

Witches brooms, for example, have provided a source of plant materials that often are very dwarf and compact in their form of growth. In some cases where viable seed is produced on the witches brooms, populations are produced that range in size from normal to extremely dwarf. This technique has yielded plant materials increasingly important in gardening by providing a new physical scale and in many cases low maintenance. Perhaps the most complete collection of dwarf hardy evergreen plants is the Gotelli Collection at the U.S. National Arboretum, in Washington, D.C.

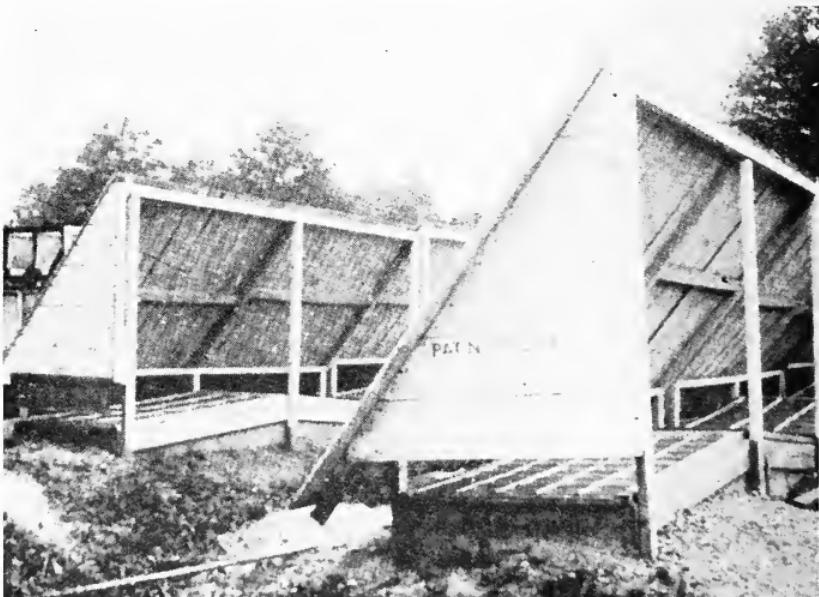
In addition to spontaneous mutations, it has been possible to apply the experiments on inheritance by Gregor Mendel (1822-1884) which demonstrated the genetic transmission and recombination of plant characteristics. These findings formed the foundation of the field of plant genetics which has been a major source of new and improved varieties of ornamental plants. Understanding plant genetics has led to the development and introduction of plants with new form and flowering characteristics, increased hardiness, tolerance of a variety of soil conditions, insect and disease resistance, and now resistance to air pollution.

Following fertilization, seed is produced and the contributions of seed physiology research come into play. Many of our ornamentals have various degrees of seed dormancy which evolved as a way of avoiding germination under adverse conditions. Knowledge of seed coat impermeability, germination inhibitors and promoters, and light requirements, have made it possible to obtain more uniform germination when it is desired. Seeds with hard and impervious seed coats block germination until the seed coats are eroded or cracked by freezing and thawing conditions. Alternatively the seed coat can be filed or its digestion accelerated by treatment with sulfuric acid. Other seeds require a cold treatment prior to germination, which often leads to a decrease in germination inhibitors and/or an increase in germination promoters. In some cases, a combination or a double dormancy is present which requires both a softening or weakening of the

seed coat, followed by a cold treatment.

We have also learned that the environment in which seeds are planted can determine the success of germination. For over a century, sphagnum moss has been used as a germination medium; it inhibits organisms which cause the damping off disease of young seedlings. We were interested to learn why sphagnum moss provided a favorable environment for germination. By making extracts of sphagnum moss, we found a substance associated with it that inhibited the growth of fungus organisms that caused the damping off. We also found in association with the sphagnum moss a bacterium that is the source of the inhibiting substance. Experience had shown that maximum effectiveness of sphagnum moss was realized when it had not been sterilized. We now understand that if one sterilizes the sphagnum moss, the fungus-inhibiting bacteria are killed, and that while the inhibitor itself is stable to heat, the bacteria are not.

Many garden plants must be propagated asexually, by cuttings or grafts, to ensure genetic uniformity and to retain desired plant characteristics. Bell jars were among the first structures in which cuttings were propagated. Under them humidity increased in the restricted air space and this decreased the moisture lost from the cuttings. By coming to understand the anatomical structure of plants and leaves, we have learned that cuttings may wilt because moisture is lost through stomates — openings in leaves that permit gaseous exchange between the leaf and surrounding air. When humidity is raised in the space around the leaf, it is possible to have as much water enter the leaf as leaves it; an equilibrium of water vapor exchange exists. Structures more efficient than bell jars are now used, but the basic principle of controlling moisture loss during the root forma-



The Nearing frame, developed in the 1940's by G.G. Nearing in New Jersey.

and thus decrease the amount of heat buildup, but the principle of moisture control by containment remained that of the bell jar. Other materials such as plastic film have facilitated the construction of moisture-retaining spaces, but the principle is the same.

tion period is the same. One problem with a confined air space where relative humidity can easily be increased is that it becomes a heat trap. The Nearing frame, developed in the 1940's in New Jersey, was an attempt to use only reflected light

Consider for a moment the impact plastic technology has had on horticulture. It has produced plastic mulches, so important in conserving soil moisture and in reducing weed problems. In tubular form it delivers water in minute quantities at precise locations. Plastic films are used extensively for the construction of greenhouses both on a commercial and a home scale. They are important in the transport of plant materials since they retain moisture but can provide gaseous exchange. It is difficult to imagine how we could exist without the use of plastic films. The disposal of discarded plastic films remains a problem. At Rutgers University, the development of biodegradable plastic films formulated to last a precise period of time is in progress: films that will disintegrate into a fine powder which, in some cases, actually serves as a source of fertilizer.

To return to plant propagation: another improvement of the environment in which cuttings were propagated was the introduction of humidifiers. This provided an external moisture source to achieve a high level of relative humidity rather than depending on the rooting medium or on moisture evaporated from the cuttings. It also provided the opportunity to propagate in a larger air volume since the added moisture was from an external source. This provided a buffer against extremes in temperature fluctuation, but the principles of moisture control remained the same.

In the 1950's the introduction of mist propagation was a major breakthrough in the field of plant propagation. The construction of "mist beds" is relatively simple and inexpensive. A new parameter of control was added; as the atomized moisture evaporated from the leaf surfaces, a cooling effect was realized. This cooling effect reduced both leaf temperature and vapor loss from the interior of the leaves through stomates. In addition, the lower leaf temperature reduced the respiration rate and, since it was not necessary to confine the air space, and therefore not necessary to shade, the cuttings could be propagated under nearly full sunlight. The combination of high light intensity and low leaf temperature produced ideal conditions for a high rate of photosynthesis and a low rate of respiration. The result was that cuttings propagated under mist actually accumulated carbohydrates and other substances essential for root initiation, whereas under the conditions of the bell jar or similar structure, the cuttings lost carbohydrate content, using carbohydrates at a rate greater than they were manufactured.

The introduction of mist propagation made possible the propagation of very immature cuttings. At this early growth stage, the tissues are physiologically highly active and initiate roots much more easily than when the wood is more mature. As a result, it is possible to propagate a much broader spectrum of plant materials from cuttings than before, to bring to the consumer a whole series of ornamental plants which previously were not readily available. Also, plants on their own root systems have numerous advantages over grafted plants. It has been found advantageous to raise the temperature of the rooting medium to about 75° F. The combination of cool leaves under high light intensity with a rooting medium warmer than the air provides ideal conditions for root formation.

Another breakthrough made in the 1930's was the discovery that plant growth and development is hormonally regulated. There was evidence that a number of different types of plant growth were hormonally controlled: leaf growth, stem growth, bud development, and the reaction of plants to light. Dr. Fritz Went then

isolated from plant tissues and identified the chemical called indoleacetic acid, a substance important to root formation. This led to the development of a whole series of root-forming substances.

It had been long known in Holland that some plants difficult to root responded positively to the introduction of a wheat grain into the base of the cutting. With the discovery of the auxin concept (*i.e.*, the hormonal regulation of plant root formation), it was realized that the stimulatory effect of the germinating wheat grain was due primarily to its release of auxin. This auxin was absorbed by the cuttings and stimulated rooting. Thus, a basis was established for the application of naturally-occurring auxin (indoleacetic acid) and synthetic auxins to stimulate root formation in cuttings.

There are factors other than auxins that regulate rooting. This was evidenced by the observation that easy-to-root cuttings often respond best to an auxin application, whereas those more difficult to root are less responsive. One explanation is that there are inhibitors in cuttings which actually block root formation. Spigel demonstrated in the 1960's that difficult-to-root grape cuttings could be rooted if they were soaked in tap water for 24 to 72 hours at 70° F. During this period the inhibitory material was leached from the cuttings into the water. The cuttings then rooted easily. The hypothesis was confirmed when easy-to-root grape cuttings were soaked in water taken from the difficult-to-root cuttings; after a period of treatment, the easy-to-root cuttings became difficult to root.

Other factors also influence or regulate root formation. There are cuttings that are difficult to root, contain no inhibitors, and do not respond to auxin applications. It is our hypothesis that these cuttings lack other materials, called rooting co-factors, and the degree of rooting difficulty is an expression of how many and how much of these substances are lacking. When all are present, an auxin supply is available or can be applied, and the cuttings have a sufficient supply of carbohydrates and nitrogenous substances, root formation will proceed. If any one of them is lacking, root formation will be reduced, indicating root formation in cuttings is regulated by a combination of ingredients or substances, rather than just one.

The phenomenon of photoperiodism — that plants respond to the length of day or, perhaps more correctly, the length of night — is another discovery that has had major impact on horticulture. This has become very important in regulating flowering of certain crops, such as chrysanthemums and poinsettias, known as short-day plants or those that normally flower when the nights are long. It has also been found that the rate of seed germination and plant growth can be affected by the length of day. Usually, a long day increases the growth rate, as demonstrated with the germination and growth rates of rhododendrons. Plants respond to very small amounts of light. When applied during the dark period these cause the plant to respond as if it were experiencing a long day. A technique known as flashlighting also can be used. When the plant is given thirty seconds of light every fifteen minutes it will respond as though it were growing under long-day conditions. Factors other than the photoperiod effect can regulate or influence flower development. In rhododendrons, for example, moisture relationship plays an important role: in a rainy fall, flower buds may be found that have reverted to vegetative growth. By reducing or slowing vegetative growth with growth-retarding chemicals, it has been possible to induce flower formation on these same shoots.

An understanding of plant nutrition is another very important area of horticultural science and technology. Early experiments by Jean Van Helmont (1577-1644) showed that most of the plant's bulk developed through the process of

photosynthesis rather than from large quantities of material from the soil. Although a small component by weight, the soil does play a key role in providing the major and minor elements essential for plant growth. It has been possible to develop fertilizers that are released slowly after their application, and thus become available over a relatively long period of time, reducing the potential for phosphate pollution of the ground water.

The production of virus-free plants through plant tissue cultures is another major breakthrough in horticultural science. Initially, the technique involved cultivating the tissues of the plant's growing point (the apical meristem) to obtain virus-free plants. It has now been expanded to propagating a wide range of plant materials. A large amount of callus tissue can be grown in an undifferentiated state in one medium. Tissues are then transferred to a second medium where shoot and root formation is stimulated. Originally used extensively for orchid and fern propagation, the technique now is applied to a wide range of woody ornamentals. As a result, many hundreds of thousands of plants can be produced in a small room under aseptic conditions. Tissue culture makes it possible to produce plants from a single pollen grain. This accomplishment is interesting from an academic standpoint, but it has some very important implications for plant genetics. The plants produced from pollen grains have half the number of chromosomes of the parent plant, and are called haploids. By doubling the chromosomes of such plants, one may obtain plants that are homozygous, or so-called pure lines. For many ornamental plants with a very heterogeneous genetic background, this provides an extremely valuable technique for producing genetically uniform material. It becomes possible to isolate various traits of a plant that may be valuable for their growth characteristics, appearance, or resistance to various pests.

As we look into the future, a later development in this field of tissue culture may be the growth of a wide variety of plants from single cells. This is now being tested as a selection technique. That is, when looking for a hardy variety of a specific plant, it is possible to grow many millions of cells in a flask and expose the flask to low temperatures. Those cells which survive the exposure are "hardy" or tolerant of low temperature. If the cells can be grown back to whole plants, a population of more hardy plants results.

The final possibility, and one that is both exciting and an area of concern, is that of genetic engineering. This is being explored now in attempts to transfer nitrogen-fixing ability from bacteria which live in association with such leguminous plants as peas and soybeans to common bacteria known as *Escherichia coli*. The ultimate step is to transfer this nitrogen-fixing ability from the bacteria to a higher plant. The goal is to produce corn, rice, and wheat plants (as well as ornamentals) that have the ability to synthesize or manufacture their own nitrogen. This would reduce crop production costs as well as the potential for environmental pollution from nitrogenous substances.

In the 200 years since the founding and development of our country, science has contributed to significant advances in our knowledge about plants, the environment, and their interactions. The information has been used to provide a wealth of new and varied plant material which we can grow better than before, and under a wider range of conditions. Science has made gardening more varied, a little easier, and accessible to a greater range of people and places.

A nineteenth century garden spray program using powder bellows as illustrated in Peter Henderson, *Gardening for Pleasure*, 1888.



A Matter of Taste: Garden Arts and Vogues

John Philip Baumgardt

Horticulture is the cultivation of an orchard, garden, or nursery on a small or large scale and it is the science and art of growing fruits, vegetables, flowers and ornamental plants. The arts of horticulture include the skills and crafts which demand knowledge and dexterity. The vogues of horticulture are its tastes, usually changeable and commonly reflecting the artistic styles of the period. At any given period a particular style of garden may be the fad; Andre LeNotre (1613-1700) of France created the intensely formal style, the garden was an extension of the architecture which it surrounded, really, and the elements of the period included parterres, elaborate stonework, formal terraces, grand fountains, temples, and statuary, and absolutely controlled vistas. The reaction to this was Lancelot (Capability) Brown's landscape garden which, in a way, was equally contrived but which resulted in an apparently "natural" scene. There was the Victorian vogue, an Edwardian period, and today we see modern gardens, so-called Japanese gardens, and gardens with no apparent style at all. Each of these design styles calls for the elaboration of certain gardening arts — the interminable hedging techniques of the parterre garden, the precise stylized pruning of the Japanese garden are both based on common pruning methods — and certain arts, spading, propagation, plant forcing, and bank work, for example, are more or less common to all of them.

The Background of Early American Horticulture

The colonies which developed along the east coast of North America were European and their temper was European. The New England colonies and those through the Mid-Atlantic area largely were adaptations of their British background. The Mid-South region, while British genetically, traded largely with France and the culture of the Carolinas and Georgia had a strong French flavor. Florida and the Gulf settlements were polyglot — a Spanish-French hodgepodge with Portuguese, West Indian, and various other influences intermingled hit or miss. The Southwest and California began with the purest of Spanish tradition.

Through all of this it is interesting to note that nowhere through the period of colonization of the continent did the American Indian influence play a part. The Indians had little to offer the invaders except a few strange fruits and vegetables, a medicinal plant or two, and that much publicized technique of including a fish under each hill of corn. Rather, the settlers stuck to their Old World traditions as closely as conditions allowed and, as memories faded, the New World influences blended with the Old creating relatively strong local styles, techniques, and methods.

The Chronology of New World Development

In 1492 Columbus crossed the Atlantic to reach India in order to short circuit the Venetian and Genoese monopolies in the spice trade. Europe was shifting from the Middle Ages into the Renaissance and exploration and exploitation were in the air. Plants were important; plants for agriculture, plants for food, plants for medicine, plants for fibers and cordage, plants for scent and taste. At the beginning of the sixteenth century Europe was relatively stable, and peoples were relatively unmixed. This would be the stock which would take its methods and tastes to the New World.

The British Isles, under Henry VII, were insular, no world force; a nation of sheepherders and farmers, of small tradesmen and artisans. Horticulture was utilitarian, producing kitchen truck and fruit, herbs for taste, as scent, and to be used as simples. Parklands were for deer, the aristocracy fortified itself and looked down on moats rather than gardens, and the cottagers grew mixed patches of useful and pretty things. You see it today in the charming gardens of Stourbridge Village.

Spain, with the expulsion of the Moors completed, slipped comfortably into the accoutrements of Moorish culture which remained as luxurious residences with magnificent courtyards and gardens. Unfortunately, none of the early constructions of Spanish gardens remain in America for us today but there are fine reconstructions in Florida and, particularly, in California.

The Holy Roman Empire — by this time neither holy nor Roman — included France, Burgundy, some of the German States, Austria, the Swiss Cantons in part, and portions of Italy; there was considerable internal strife, with the beginnings of the death throes which were to end finally with Napoleon. Horticulture was sparse; virtually nothing was available for export to the New World.

Portugal, a force in ocean exploration, was long on tropical pillage but short on home gardening.

The Sixteenth Century in the New World

Voyages of exploration were followed closely by voyages of exploitation. The utilizable aspects of all natural history were of definite interest to the promoters of all voyages and after the first wave succeeding trips carried settlers to claim land and all that grew on it. From the beginning foods, fibers and cordage, oil yielding plants and plant parts, perfume plants, and medicinal plants were major exports from the New World to the Old. Pumpkins, peppers, tomatoes, potatoes, beans, and squash were among the earliest plants to cross the Atlantic.

This year of 1976 is not the Bicentennial for horticulture in America. White men grew plants in the New World in European style gardens four hundred years ago. Francisco Coronado explored north of the Rio Grande, Hernando de Alarcon discovered the Colorado River, and Don Garcia Lopez de Cardenas discovered the Grand Canyon all in 1540; settlement of the missions followed shortly, and every mission, built according to the Spanish archetype, included extensive gardens with imported grapes, herbs and simples, and vegetables. The library in the Strybing Arboretum, Golden Gate Park, San Francisco, is replete with well researched information on these early mission gardens. Menendez founded the city of St. Augustine in Florida in 1565 and kitchen gardens with tropical fruits — the olive plantings failed — went in with the first construction. Sir Francis Drake landed on the shore of what now is Marin County, California, and planted a metal plaque (not unearthed until 1936) claiming the entire coast for Queen Elizabeth; he left no gardeners to dig in and prove the claim so eventually Spain and Russia engaged in claim-jumping.

On the East Coast north of Florida not much was happening; the Roanoke settlement failed, but Jamestown took root early in the next century (1607).

New World Horticulture in the Seventeenth Century

With Jamestown, Youngstown, and Middle Colony firmly established in Virginia and with the Puritans digging in on Plymouth Rock early in the seventeenth century, New World Horticulture as we know it today was here to stay. The Anglo-Saxons brought their cottage gardens with sage and salsify, sweet rocket and clove pinks, and other plants we grow today. They brought garden arts we

use; fall spading, fallowing over winter, and spring seeding; wattles to exclude foraging rabbits, nesting containers for songbirds. They trundled soil and manure on wheelbarrows perhaps more massively wooden than ours, and they swept the walks and grass plots with a twig besom rather than our contemporary bamboo or wire lawn broom (or the ultra-contemporary power lawn sweeper) but the result was the same. Modern American gardeners could have made out very well in those early East Coast colonial gardens and might have learned a few things about cistern and well construction, walk and drain building, and seed gathering and preservation.

Those early East Coast settlements had little in common due to varied ethnic backgrounds and in some cases unique religious tenets. The austerity of New England, apparent in houses, gardens, and garb was not reflected in the freer styles of Maryland. During the seventeenth century East Coast gardeners and naturalists made contact with European plant lovers and a very healthy give and take. Within the century King Charles I's gardeners, the Tradescants, father and son, grew some dozens of American species and finally young Tradescant sailed over to do some plant collecting first hand. One of the earliest of the noted plant explorers who apparently did a nice job of gardening with native species was John Banister of Tidewater (Virginia) territory. He worked largely out of Middle Plantation which was soon to become the Royal Governor's seat known as Williamsburg.

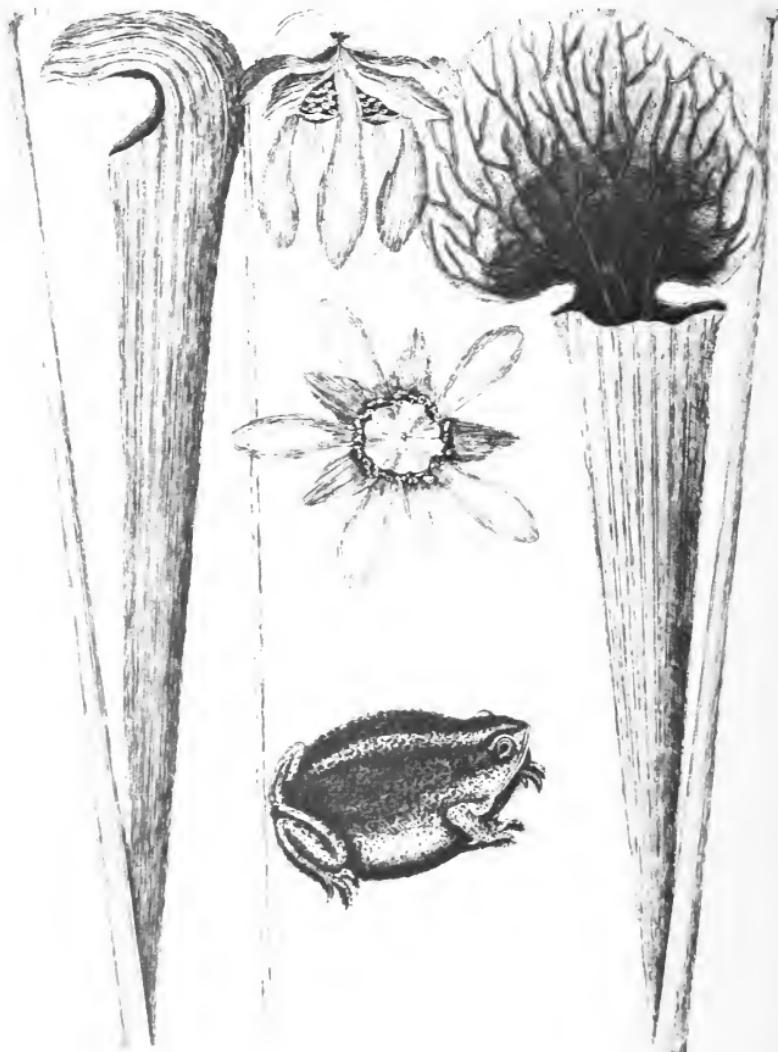
Eighteenth Century Gardens and Gardeners

The eighteenth century was the age of reason, the age of taste, and the age of flowers. Early in the century gardens were corollaries of architecture but by the close of the 1700's gardens existed of and for themselves.

In America the eighteenth century saw the establishment of self-sufficient towns and communities with the development of cultural amenities including ornamental horticulture. Gardens were here to stay, and they were not necessarily utilitarian. A study of Williamsburg reveals gardens designed to please, gardens designed to amuse. Gardens for active sport such as playing at bowls or dallying in the maze. Formal gardens added pergolas and covered walkways — interestingly enough, almost exactly like those of the thirteenth and fourteenth century castle gardens. Topiary work came into its own; back home in England styles were changing; people were surfeited with garden formalism and Lancelot Brown and others lead the way to landscape gardening with a Rousseau-esque "return to nature," but for the transplanted Englishmen settled along the James River there was altogether too much untrammeled nature. While formal gardening died out in the Old World it was embellished and magnified in the new. It became the thing to introduce spectacular native species into the garden and so flowering dogwoods, magnolias and American (Virginia) bluebells were treasured. Architectural styles and furniture makers such as Chippendale picked up from world travellers an oriental motif called Chinoiserie and soon the New World gates, benches, gazebos and fences echoed the new fad.

Before the Revolution a great garden was building down on the Ashley River in South Carolina. Henry Middleton, Governor of South Carolina, President of the First Continental Congress, and devotee of elegance initiated Middleton Place in 1741. This was true landscape gardening in the grand style, with one hundred slaves raising terraces, excavating canals and lakes, and generally modifying the landscape. The garden, which was nine years in construction, was as French as it could be with grand plantings of *Magnolia grandiflora* and bald-cypress. The great manor house which survived until the final days of the Civil War was under-

niably English in style and treatment. Here, finally, was America's first landscape garden, where horticultural arts modified nature to create a breathtakingly beautiful setting for plants soon to be gathered from around the world. The great botanist, Andre Michaux, after collecting camellias in France, brought four plants to Middleton in 1783. They were the first to come to America and today three of the four survive, giant specimens, to be viewed where Michaux set them nearly two hundred years ago.



English naturalist Mark Catesby (1679-1749) collected plants in the Carolinas and Florida, shipping specimens to Europe and exchanging plants with the Bartrams. The pitcher plant (*Sarracenia*) illustrated is from Catesby's *Natural History of Carolina, Florida and the Bahama Islands*, 1754.

Plant collecting in America saw its heyday during the eighteenth century. European aristocracy competed in gathering vast collections of plants and they hired American gardeners, naturalists, and plantsmen to do the collecting. Carl von Linne (1707-1778), more commonly known by his scholarly name Carolus Linnaeus, was at work in Sweden perfecting his scheme for the classification of all living things, but especially plants, in a logical "natural" system. Plant collecting became the thing to do. John Bartram of Philadelphia was appointed Botanizer in America to His Majesty George III. John, and his son William, travelled extensively collecting, describing, and even classifying plants of the New World. Their Philadelphia garden became a rallying point for plant science and set the stage for the Delaware Valley to assume leadership in horticultural enterprise.

In Virginia the scientific Mr. John Clayton (1685-1773) arrived from England in 1705 to begin assembling a notable collection of plants. Soon he was joined by the naturalist Mark Catesby (1679-1749) and together, but usually working separately, these two men, the scientist and the artistic amateur, made botanical and horticultural history. Their collections embellished Tidewater Virginia gardens, they swapped plants with the Bartrams and with others, and they shipped to Europe.

Through all of this, gardening techniques, the arts of the garden, were relatively stable. Overall garden design made some interesting shifts in various parts of Colonial America during the century. The Reform ethic had stamped New England gardens with an almost repressive austerity but during the eighteenth century some sinful glimmerings of pleasure began to sneak in. Stone walls enclosing gardens were distinctly more handsome than those surrounding fields and pastures. Garden gates gained in stylishness, and benches and arbors began to appear.

In the deep South handsome houses were built along the rivers which served as trafficways. Like the French chateaux of the Loire Valley and the Italian villas of the Brenta River these southern houses and their gardens were two faced; there was a river approach and there was another entryway from the land side. Alleys of magnolia or of live oak were planted. By and large, the gardens of the deep South began in the style of the English deer park, something to drive through, something to look at through a window or from the terrace. Only later were strolling gardens added. Of course, extensive kitchen gardens existed from the onset, but these were outside the experience of the grand folks in the big house.

Sadly, America's first gardens, those mission grounds along El Camino Real in California and the Southwest were not faring so well. They were under the jurisdiction of Mexico; before long the properties would be secularized and the buildings and plantings would fall into disuse.

American Horticulture in the Nineteenth Century

The nineteenth century saw the establishment of America's great botanic gardens and arboreta. With these scientific institutions came knowledge. Gardeners began to gain insight into soil management which translated into the fine art of double digging or trenching. The physiological processes of plants and even of plant cells came under investigation and soon gardeners came to understand the whys and wherefores of manuring and fertilizing. Plant disease control and insect pest control translated itself into the earliest glimmerings of garden spray programs. Gardening arts were coming on thick and fast.

American society was beginning to stratify more clearly with a relatively coherent nation and a relatively stable economy. The upper crust thickened and began to ape its European counterpart with grand houses and grand grounds. Not that these people were horticulturists or even amateur gardeners. It was the thing to have a garden and that meant, usually, European trained gardeners.

In the nineteenth century another great garden developed near Middleton Place; this was the Rev. John Grimke Drayton's Magnolia Gardens, built during the 1830's, and soon to become a magnificent showplace. Mr. Drayton utilized the swamps, bayous, and low ground as a setting for oriental magnolias and azaleas. Yet today, Kew Gardens acknowledges that the place to view certain oriental azaleas in their fullest glory is Magnolia Gardens. Special techniques were developed there for propagating choice plants — layering was the earliest common method — and refinements of propagation went on for decades. More new arts for American gardeners.

Victorian tastes came on strong; public buildings, private houses, gazebos, and flower beds, all with the exciting new mechanically manufactured patterns contrived by this new modern machinery, spread like the plague across the land. Victorian horticulture, as illustrations show, had virtually nothing to recommend it save the essential skill in maintaining vast numbers of plants under absolutely controlled design. Edwardian design, to appear early in the next century, was to take the sharp edges off Victorian gardening, but tragically, a miserable blend of the two still dominates public gardening in America today.

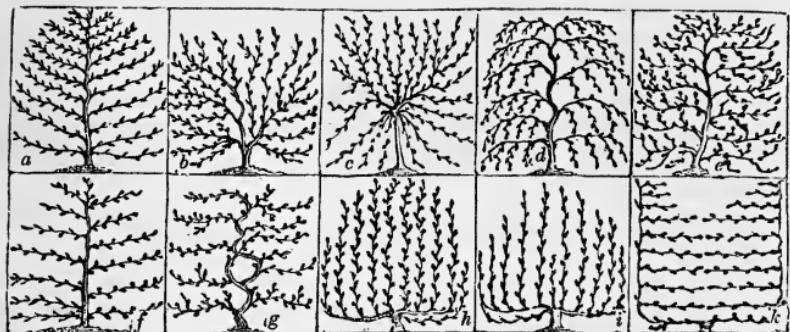
But an exciting new vogue came to America in this century. The Orient opened and released a flood of peonies, wisterias, lilies, irises, hostas, ericaceous species, and many of the spring flowering shrubs that we love today. All of this, and views of exquisite oriental gardens, brought on the Japanese garden vogue. As Oriental garden designs are intimate expressions of naturalism governed at least in part by religious concepts they were not actually adopted in the West. Rather they were adapted. We came to know gardens in the Japanese manner.

Every gardener needs help from an expert. It may have to do with design; the problem may be with cultural techniques for a particular species. In 1824 Andre Parmentier (1780-1830) immigrated to New York to become America's first commercial landscape gardener. He established a nursery in what is now the heart of Brooklyn; his designs and plantings extended from the Mid-South to Montreal. We also must acknowledge Andrew Jackson Downing (1815-1852) who wrote the first American book on landscape gardening in 1841. His work on design, methods, and especially, on pomology (the latter published by brother Charles after his untimely death) were great aids to nineteenth century gardens.

Public gardening received a great boost from Downing's work. Ignatz A. Pilat, an Austrian and an apt student of Downing's ideas, was chief landscape gardener during the early stages of New York's Central Park. This project was turned over to Frederick Law Olmsted in about 1856. The Olmsted group were competent followers of the English school of landscape design; their competence in soil management and an understanding of the cultural requirements of various plants left something to be desired and this ghost still haunts, for example, the gardens at the Biltmore Estate in Ashville, North Carolina, today. Thus appeared the first shadow of a lack of insight which plagues much of American horticulture today. Landscape design fails to take into account the variability of plants and the cultural requirements of various species.

This is an appropriate place to interrupt our flow of chronology to take a look at a few gardening arts:

Pruning; principles of pruning worked out empirically for fruit production were handed down from the Middle Ages. We see the various processes occurring



2951. *Trees with flexible stems*, such as the vine and other climbers, admit of three other varieties of training (fig. 666.) ; which, as vines bear the sweetest fruit at the greatest distance from the root, is particularly suitable for them.

Pruning for ornamental form, improved flower production, and healthier specimens as illustrated in J.C. Loudon, *Encyclopedia of gardening*, 1834.

in early tapestries and, especially, in illuminations of *The book of the hours*, in other early manuscripts, and in woodcuts of incunabula. Through the nineteenth century, with improved knowledge of plant physiology and morphology, pruning was refined. It went beyond the major aspects of hedge trimming and fruit management to include pruning for superior ornamental form, improved flower production, and healthier specimens.

Spading has been the same technique — or art — from Adam; only the tool changed, slimmed down and acquired a cutting edge through nearly two thousand years. Then, with an understanding of soil management, double digging and trenching came on the scene. It is unfortunate that with the gadgetry of the machine age few gardeners today know how to best manipulate their soil — they lack the art of spading — and year after year the ground they work deteriorates rather than improves.

Turf management; growing grass as an ornamental crop has undergone constant change from the first sheep-grazed village commons and hand-scythed turf plots to plantings of specially developed grasses managed with precision machines and treated with special chemicals. The art of developing fine turf is a very local proposition because turf grasses are highly sensitive to environmental variations and to soil conditions. High maintenance lawns appeared during the Victorian period and have evolved continuously ever since.

Watering; the technique remains the same, that is, apply water to plants outdoors when rainfall is insufficient and indoors when growing conditions warrant it. The method has changed; instead of hand carrying water in a can from the stone or lead cistern in the garden today we run it through hoses, or even through permanently installed water lines. We have gained in convenience but in some cases the plants have come out on the short end of the stick because they do not receive individual attention.

Glass culture; once the hobby of the aristocracy — actually a tool of their gardeners — via the orangerie which was a barely heated building with a south wall largely of glass, conservatories began to develop during the eighteenth century rape of tropical lands, a trend which culminated in the begabled and domed glass monstrosities of the Victorians. Then came the utilitarian glasshouse or greenhouse design based on function, which dominates the commercial scene today.

To return to the nineteenth century for a final boost to gardening arts; it was embodied in a little old lady who was trailed by a quantity of cats. She was Gertrude Jekyll (1843-1932); her contribution was based on a strong affection for all growing things and a deep understanding of their cultural requirements. Miss Jekyll taught gardeners to place their plants where conditions were optimum for them; it is a lesson we still are learning. Her sensitivity to color schemes in the garden started a new vogue which, among certain gardeners still is the way to do it today.

Twentieth Century Contributions to Gardening Arts and Vogues

Just after the turn of the century rock gardens were all the rage. Some were built with no understanding of design or suitable plant environments, others were successful. From this beginning came specialization in alpines where many gardening arts have to be honed to razor sharpness and brought to bear if the project is to be successful. Growing alpines in the lowlands definitely is not a pastime for beginners.

The twentieth century brought vogues in dahlia culture, in perennials of various sorts, in rose breeding and growing; a vast interest in various ericaceous species and cultivars arose where these choice plants thrive.

Much of this plant specialization was made possible because of scientific developments. Soil science, genetics with the practical application in plant breeding, scientifically organized plant exploration and introduction, research programs in horticulture departments of colleges and universities and in botanic gardens and arboreta which ceased to be purely museums of living plants: all of this development improved existing gardening methods and introduced new ones. Among the most important innovations were disease and insect control and plant fertilization techniques utilizing controlled amounts of known nutrients.

Today as the twentieth century wanes horticulture, along with other aspects of gracious living, seems to decline. Just as the opera and the symphony, fine arts and drama, all struggle for existence, gardening, too, is losing its array of arts and there is no strong trend of style, no vogue to catch the public interest. Instead of taking pride in knowing what to do and in developing the dexterity to do it well, we look for shortcuts. Now, at a time when every known gardening art needs to be utilized so that everybody in the land can enjoy a healthy, beautiful environment, we are losing the touch.

Perhaps we need to remember particularly, comments of two people who loved America.

One was the eighteenth century English statesman, Edmund Burke, M.P., who diligently supported the colonial cause in Parliament and out; he said, "To make men love their country, one must make their country lovely."

The other was George Washington, who addressed the Nation as he left the Presidency in 1796, stressing the need for enlightened public opinion and cautioning against devices of "small, artful, enterprising minorities" to control or change the government.

Had Philadelphia heeded these statesmen, Philaflora would be a reality today, a new vogue to promote the gardening arts throughout America's cities which are so in need of a breath of beauty, a touch of green.

The Houses and Tools of Horticulture

Carl L. Withner

Plants, like people, improve with knowing, and this leads most naturally to collections and collectors. William Cowper wrote long ago, "Who loves a garden loves a greenhouse too ... there blooms exotic beauty, warm and snug, while winds whistle and the snows descend." These crystal palaces in miniature can be traced from the Romans to modern times, paralleling human interests and endeavors, gradually developing with the efforts of imaginative technology. The art of greenhouse construction has required stabilized societies with time to devote to the study, care, and expense of growing plants in northern climes. These conditions sufficiently prevailed during the seventeenth century in Europe and England. Science and botany were beginning to develop, and the explorations of the new world and the tropics for trade and new items of exotic interest provided the ultimate stimulus for the growing and studying of plants. The Romans started the greenhouse, and, after a long hiatus, the Dutch and English developed it; they representing the two countries most interested in trade and plant husbandry. Today in America we are making our own advances and particular contributions to this art.

One greenhouse historian, Kenneth Lemmon, described the "Orangery age as that of the noble dilettantes of the Restoration, the Stove era as that of the philosophical, experimental period — the Age of Elegance; and that of the Greenhouse and Conservatory as that of the highly decorative, social status period — the Victorian." We must now be entering an age of Controlled Environments with concerns for ecological balance, greater food production, and better harmony with the Forces of Nature.

In the United States 200 years ago there was hardly the luxury or elegance that was possible in Europe, but Dutch, English, and also Swedish influences were strongly felt, particularly around Philadelphia. In 1683 a forward-looking William Penn (1644-1718) was writing pamphlets for distribution in England telling about his new land and all the natural produce that was available. He wrote mostly about peaches and grapes and of the peach he reported "...not an Indian Plantation without them; but whether naturally here at first, I know not, however one may have them by Bushells for little; they make a pleasant Drink and I think not inferior to any Peach you have in England except the true Newington."

Penn also fostered the development of a 200-acre vineyard, one of the first in America. It was planted by Andrew Doz on the east side of the Schuylkill on what is now Lemon Hill in Fairmount Park. When Philadelphia was laid out, Penn included five public squares and in the center a great square of ten acres, advising the people to surround their homes by gardens, fields, and orchards so that they could have a "green Country Towne, such will never be burnt and will always be wholesome."

Franklin's *Poor Richard's almanack* began in 1732 its important role in providing agricultural education. By 1728 Franklin's friend, John Bartram (1699-1777), had established the Bartram Botanic Garden at Kingsessing on the banks of the Schuylkill, and developed an enthusiastic and voluminous exchange of letters, seeds, and cuttings with equally enthusiastic gardeners abroad. This included Linnaeus, who called Bartram the greatest natural botanist in the world, together with hundreds of letters and exchanges with Peter Collinson (1694-1768). Collinson first mentioned greenhouses of the United States in a letter about Colonel Byrd of Virginia who "has the best garden in Virginia, and a pretty

greenhouse well furnished with orange trees." Bartram wrote in 1760, "I am going to build a greenhouse. Stone is got; and hope as soon as harvest is over to begin to build it — to put some pretty flowering winter shrubs, and plants for winter's

HISTORY OF GREENHOUSES.

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tury. In the *American Florist* for Feb. 15, 1887, is the description and figure of what is supposed to be the

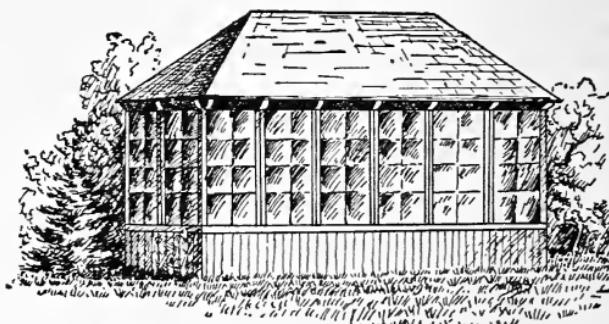


FIG. 2. FIRST AMERICAN GREENHOUSE.

first American greenhouse (Fig. 2), it having been erected in New York, in 1764, for James Beekman. Although the structures were less elaborate, the American builders took up and utilized any improvements in construction and heating that were brought out in Europe.

In *Hovey's Magazine of Horticulture*, for January

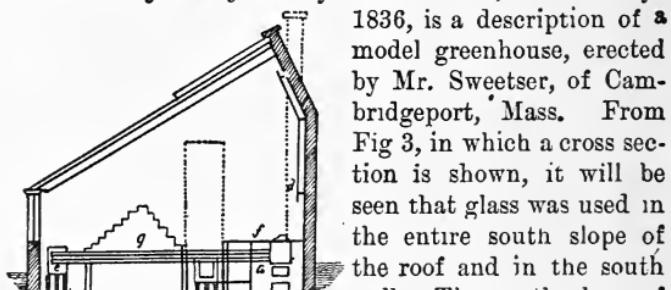


FIG. 3. MODEL GREENHOUSE OF 1835.

the roof and the north wall

were of wood. The heat-

ing system combined the flue with hot water. The hot

A sketch of what is supposed to be the first American greenhouse constructed for James Beekman in 1764, from L.R. Taft, *Greenhouse Construction*, 1911.

diversion; not to be crowded with orange trees, or those natural to the Torrid Zone, but such as will do, being protected from frost." Much later, as the garden changed hands, it was noted for its collection of cacti under glass.

Robert Morris (1734-1806), at the time the wealthiest man of America and the chief financier of the American Revolution, had, as one of his estates, "The Hills," now Lemon Hill, where the vineyard once stood. This was famous in its time for its gardens and trees, and "there were hothouses for oranges, pineapples, and other tropical plants." From such accounts we can retrace a greenhouse bicentennial concurrent with that of our country, and your [Pennsylvania] Horticultural Society.

The actual "first" greenhouse in the United States is supposed to have been one in New York City erected in 1764 for James Beekman. Most likely Bartram's greenhouse and many other early types are copies of this simple construction with glass only on the sides, and thus reflected the Anglo-European experience with the orangery.

By 1836 a Mr. Sweetser of Cambridgeport, Massachusetts, had an all glass lean-to set against a wooden wall; also in 1836, Chicago had a three-quarter span house; by 1855 Frederic A. Lord had built his first greenhouse in Buffalo, and by 1872 had entered into partnership with William A. Burnham to form Lord and Burnham of United States greenhouse fame. By the 1880's they specialized in the curvilinear type of frame work construction, so well known to us through famous conservatories, as well as present home lean-to structures.

We may digress a moment for the meaning of the word "greenhouse," or one of its several synonyms. The early English plantsman was interested in preserving "greens," as plants were called, as an adjunct to the garden, for study, and to provide winter pleasure. How natural then to speak of a greenhouse or greenhouse. This terminology would also readily follow, when translated literally, from the early Italian *viridarium*. Conservatory is easily understood as a place where plants can be protected from the elements, and the French *serre* for greenhouse implies the same. John Evelyn (1620-1706) is credited with the first use of the terms "conservatory" and "greenhouse" in his famous book, *Kalendarium hortense: or, the gard'ners almanac, ...* (London, 1691), the eighth edition of that work.

The Romans called their structures *specularia* after the name of the thin sheets of mica and talc they used for glazing. It was the doctor's prescription of a fresh cucumber a day for Tiberius Caesar that encouraged these earliest efforts to grow plants in movable baskets filled with manure-warmed soil. The Romans also tried peaches "under glass," but some said they were so pale that they were not much better than turnips for eating. Pompeii has ruins of an apparent specularium with hot air flues, though Seneca wrote, "Do not those live contrary to nature who require a rose in winter and who, by the excitement of hot water and an appropriate modification of heat, force from winter the later blooms of spring?"

The orangery, or *citroniere*, a necessity for growing citrus fruit in Northern Europe and England, was the forerunner of our modern greenhouse. Citrus fruits were much in demand, were eventually sold as a greenhouse crop, and one report from the gardener of Beddington estate in England lists 10,000 oranges gathered in 1691!

Initially the orangery was a movable building constructed of shutters and frames around the trees set in a garden. Later the trees were planted in tubs or boxes and moved in and out of a permanent structure of stone and glass. It was a long, narrow building, though often tall so that trees could reach 25 feet, and faced south with a solid wall on the north. Often a second floor over the orangery provided a home for the gardener. [See Taft, *Greenhouse construction* (1904). Chapter I.]

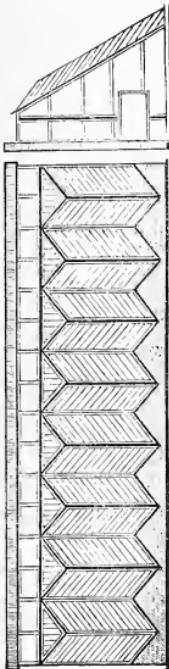
The Dutch were particularly adept with citrus, and the orange house at Leyden Academy around 1676 was famous. It was the demand for citrus that brought the greenhouse to England. John Parkinson (1567-1650) even wrote in 1629, "For the orange tree hath abiden with some extraordinary looking (after it) and tending of it ... They must be kept in great square boxes and lift there to and fro by iron hooks in the sides ... to place them in an house or close gallery for the winter time ... but no tent or mean provision will preserve them."

The orangery was heated first by open charcoal fires, later by more efficient and permanent heating systems, as they evolved in complexity and technology. The orangery at Versailles, completed in 1686, was designed by Jules Mansart, was 508 ft. × 42 ft, and housed 3,000 trees! Salomon DeCaus (1576-1626) provided a movable structure in 1619 to house 400 trees, some 60 years old, for the Elector Palatine at Heidelberg. We can understand why Bartram said his greenhouse was not to be crowded with oranges!

To provide the interior of the orangery with more light, windows were enlarged and the roof frames were glazed. It was an easy step to convert the entire south-facing wall into a lean-to style with no separate roof at all. In a recent paper Britz detailed the contribution made also by fruit-walls to the evolution of the early greenhouse. South-facing walled gardens with espaliered fruit trees and grapevines were common in Northern Europe. Often a longer season was necessary for proper ripening and, therefore, a straw "tilt or matt" was placed against the wall to protect the trees and to extend the season. The idea of permanently combining a tilted glass wall with the masonry wall and heating it by furnace and flues led then to development of the "stove," or as it was later called, the "hothouse."

Leuchars covered this topic thoroughly in 1859, and described future developments when he wrote, "Houses that are only glazed in front, and have glass roofs, but otherwise opaque, are also objectionable, as plants can never be made to grow handsome. They become weakly and distorted by continually stretching towards the light, neither do they enjoy the genial rays of the morning and evening sun, and only perhaps for a few hours during midday. If such houses be large and lofty, they are still more unmanageable, as no culture can keep the plants symmetrical and of good appearance.

"A greenhouse should stand quite detached from all other buildings, and may be of any form the fancy may dictate, or the position suggest. It may be circular, oval, hexagonal, octagonal, or a parallelogram, with circular or curved ends. The house, to be proportionate, should be about fifty feet in length by twenty in width, and fourteen feet high, above the level of its floor; if more effect be required from the external view, its parapets may be raised to give the house a loftier appearance."



The ridge-and-furrow roof illustrated in Leuchars, *A Practical treatise on the construction, heating, and ventilation of hot-houses*, 1860.

Arguments arose over the angle of the greenhouse glass wall. "The secret of the stove," said the Sherards, after visiting the new greenhouse in Leyden, "consists in making the angle of the shutters equal to the angle of the Pole which (in Leyden) is about 52 degrees. This causes the sun to fall in a straight line without any angle of reflection. The other secret, in philosophy, is the having of the glass of the stove to go to the top of it that there may be no place left at the top where the sun does not shine on it. If any such place be left in the shade the vapours will be raised into it and after the sun is off, fall down on to the plants and mould them, the making of the back part of the stove sloping, and glass to the top prevents this."

CURTIS'S BOTANICAL MAGAZINE,

CONTINUING THE

Plants of the Royal Gardens of Kew,

AND

OF OTHER BOTANICAL ESTABLISHMENTS IN GREAT BRITAIN:

WITH SUBLIME DESCRIPTIONS;

AND

A SUPPLEMENT OF BOTANICAL AND HORTICULTURAL INFORMATION.

BY

SIR WILLIAM JACKSON HOOKER, K.H., D.C.L., OXON.

I. L. H., F. R. S., and L. S., Vice-President of the Linnean Society, and Director of the Royal Botanic Garden of Kew.

VOL. I.

OF THE THIRD SERIES:

(See Vol. LXII. of the whole Work.)



"Nature and Art Unite; the page unites
And beauties to beauties give out in either choir."

LONDON:
REEVE, BROTHERS, KING WILLIAM STREET, STRAND;

1845.

This title page from *Curtis's Botanical Magazine*, shows the Great Conservatory at Chatsworth, erected by Joseph Paxton using Loudon's ridge and furrow idea combined with a curvilinear shape.

In England the rule of thumb was to build the roof at a 45° angle, thus, in London, making it perpendicular to the sun in April and September, and at the most oblique in June, when the rays were powerful. The same principle if applied to Philadelphia, as Leuchars' book of 1859 explains, would be a 34° roof. Tables of the angles of reflection were calculated for every latitude and were much discussed and used. The quest for improved light went on. The lean-tos, or forcing frames, as they were called, gradually disappeared, and span or double-roofed houses became the rule, or occasionally a hillside house was in demand.

John Claudius Loudon (1783-1843), with his 1817 book, *Remarks on hot-houses*, and several subsequent books and encyclopedias, had a major influence on nineteenth-century horticulture. To satisfy his concern for light perpendicular to the glass for a maximum period of each day, he designed ridge and furrow glazing that would catch the "two daily meridians" of the sun. Loudon later suggested the use of ridge and furrow over large areas, but he hardly envisioned the acres that are presently housed under such glass. The ridge and furrow remains a favorite pattern.

In 1816 Loudon invented a wrought iron sash bar, molded and drawn to desired patterns, that easily permitted curved surfaces and increased spans because of its strength and single-piece construction. The iron bars also meant larger panes of glass could be used and less light was blocked from the houses — a highly desirable point. Loudon equated the lack of greenhouse light to "insipidity and tartness," its presence to "aroma and flavours." Loudon also promoted ridge and furrow constructions roofed with corrugated iron or other materials for building covered markets, schools, theaters, train stations, and arcades. His ridge and furrow concept reached its ultimate development in Joseph Paxton's construction of the Crystal Palace in 1850, a sensationaly successful building subsequently copied on the continent and also here in New York.

Curvilinear houses, as the new structures using the iron sash bars were called, had the property of permitting much light to enter the greenhouse, yet, by the constant movement of the sun and the continuous curve of the glass, the sun's rays were never concentrated enough in one area to do damage inside. In general, the curvature was designed to be a segment of an ellipse. An ideal hothouse would then have curved, rounded ends and curved sides. Loudon also recognized the need for a continuing outside air supply and air movement within. Various devices were designed, and a whole sub-art of ventilation of glass houses was developed. One of the most interesting was James Kewley's "automation gardener," patented in 1816, that helped open and close hinged roof and wall vents as temperature changes occurred. Though manually operated, this was a precursor of the thermostats and more sophisticated automatic devices now used to control the greenhouse environment.

Of the famous greenhouses constructed in the last century, a few are of particular interest. The Great Conservatory at Chatsworth, erected by Joseph Paxton (1801-1865) between 1836 and 1840, used Loudon's ridge and furrow idea but combined it with a curvilinear shape. The building was of wood and glass ex-

cept for cast iron columns, doubling as rainpipes, that supported the arches. It cost £33,000, was 123 feet wide, 277 feet long, had a roof 67 feet high, a gallery for viewing, and a center aisle wide enough for royal visitors to ride through in an open coach! The 10 x 48-inch panes were prepared by a new method from blown cylinders of glass. The Great Conservatory was the property of the sixth Duke of Devonshire, Paxton's wealthy patron. Paxton, originally a gardener's apprentice, was knighted for his design and his construction plans for the Crystal Palace. Of lesser note was the glass wall at Chatsworth, also built by Paxton. Paxton's Crystal Sanatorium, designed to provide pure air and sunny climate for the ill, rather than the London winter smog pollution responsible for many respiratory ailments, anticipated modern air conditioning and climate controls for whole communities — the biomes of tomorrow.

The discovery of the exotic *Victoria amazonica* water-lily (syn. *V. regia*) in the Amazon was made by Thadeus Haenke in Bolivia in 1801, and again by von Humboldt in 1819. Specimens were first sent to London by Robert Schomburgk in 1836. This activity inspired the development of aquatic houses, usually round, and with provision to heat water, soil, and air. The race to grow and first flower this water lily was won by Paxton at Chatsworth, from seeds received from British Guiana by Drs. Rodie and Luckie in February 1849. The first flower was presented to Queen Victoria and Albert at Windsor Castle on 8 November 1849. The colony eventually produced, in its special house, 172 flowers and 140 leaves in one season. Richard Turner's Victoria Regia house at Kew dates from 1852 and may still be seen there. Houses were also constructed in Leyden, Brussels, and other gardens, so great was the fascination of this famous water lily that we still admire today. [For its first flowering in this country in 1851 see the reference to Thomas Meehan's account. Ed.]

Inspired by the Great Conservatory at Chatsworth, Richard Turner designed also the palm house at Kew (completed in 1848), and following Paxton, achieved fame from his elegant greenhouse designs that featured wrought iron arches. When Nathaniel Lord Britton (1859-1934), botanist from New York, visited Kew in 1888, he was inspired to have a similar edifice constructed here — the New York Botanical Garden Conservatory, designed and built by Lord and Burnham in 1899.

Time permits no more than a brief mention of the evolution of glasshouse heating devices. The discovery of thermal siphoning and the development of steam and hot water systems parallels the construction of more efficient furnaces and boilers. Each type of greenhouse had its specific requirements: for a stove for exotics, a fernery, grapery, pineappling, heathery, various fruiteries, an orchi-darium, or for a conservatory.

Conservatory design often followed faddish architectural themes — Japanese, Chinese, Indian, or Turkish, for example — or were constructed on the roofs of town houses, used for elegant entertainments, and generally reflected the opulence and ornate decoration of the Victorian era as it reached its apogee. The invention of the Wardian case by the English botanist Nathaniel Bagshaw Ward (1791-1868), and his first book in 1842, *On the growth of plants in closely glazed cases*, was an important precursor for conservatory development. This case permitted the shipboard importation of many tender exotics from far off lands, at a time when the interest in, and competition to obtain, rare new species were at an all-time high. This was also an era for the publication of many fine horticultural books and periodicals with hand-colored illustrations, where new species after species were faithfully and beautifully recorded.

The glass case he invented enabled Dr. Ward to send successfully roses, violets, and other temperate plants to the colonists in Australia, homesick for English "greens" and flowers. The voyages took as much as eight months in the 1830's, the ships passing through tropical heat and snows of the Straits of Magellan. Yet without a single watering a majority of the plants would survive. Ward was even able to grow filmy ferns, "the absolute despair of even the most expert gardeners." His fame spread and Wardian cases were used all over the world, enabling the British to start, among other plant introductions, a tea industry in India by introducing some 20,000 tea plants from China planted in these glazed boxes. [See, Schoenermarck (1974).]

Today one would call them terraria, and they are no less popular now than in their heyday, particularly for apartment or city dwellers plagued with limited light, inadequate humidity, and polluted air. Smog as a health hazard was one of Dr. Ward's main concerns about life in English cities. To improve the quality of living he also tried to encourage window gardening among the working classes.

Many elaborate designs for window cases appear in gardening books of the period, miniatures of the overly decorated conservatories, often combined with small fountains or aquaria. As reported and illustrated by Henry Williams (1874) and by John Mollison (1889), some of the Victorian concoctions are almost beyond belief to a viewer of today. No less, the proposed use of plants indoors, as the conservatory style invaded adjoining parlors, makes us stop to wonder about all the hours spent in growing, arranging, and caring for an unbelievable variety of plants. By Victorian times, with the development of a wealthy middle class, the conservatory and the art of gardening had become an integral part of a certain way of life.



The proposed use of plants indoors in Victorian homes illustrated in Henry Williams, *Window gardening*, 1872.

One of the remarkable points to make in this account of greenhouse history is how little have the tools for horticulture changed. True, some mechanization followed the invention of the steam and then the gasoline engine, but essentially they are still the same — the hoe, the rake, the shovel or fork. Various in their shapes, and various in their sizes, their effectiveness has yet to be improved. There is a detailed dissertation by Tarryer in *American garden* in which he described the right kinds of woods, curvature, size, and heft for proper hoe handles — a pleasure to read in this day of mass production. He recommended, incidentally, black walnut, cherry, or cottonwood, though ash "will bear more careless usage." It was doubtlessly a great relief to greenhouse men when plumbing and hoses with running water came along, for then the hand-carried and hand-pumped devices necessary for watering and syringing could be discarded. Many today, however, continue to swear by their favorite old watering can.

I was curious to learn what information is recorded about animals as "tools" but found little. My gleanings, however, include pigs, geese, sheep, and naturally, the horse. Manure from horses as well as other farm animals needs hardly an elaboration of its virtues. The warmth from fermentation was used by the Romans and is still used today for heating cold frames and other "temporaries." The major problem now is that we cannot afford manure in the needed quantity. Nonetheless, it remains unsurpassed for warming, conditioning, and fertilizing the greenhouse soil.

When preparing new gardens or fields, particularly scrub, hard soil, dense weeds, or brush covering the area, early American farmers found nothing so effective as pigs. When confined to a small area, these porcine helpers would root up the ground and bring even the toughest land into a cultivatable condition. They must, however, be well supplied with water. Their fencing must be adequate and be moved from place to place until the job is complete.

Sheep were used in colonial times, and later, for mowing lawns, eating the grass more closely than cows but not too far down, as goats do. Geese were also used for eating grass, particularly in berry patches that were otherwise time-consuming to weed and manage. The water for the geese was placed at one end of the field, their grain at the other. As they waddled back and forth, the weeds were eaten en route.

What can we foresee for the future? Modern homes and buildings now house plants and people together. Complete climatic controls are available, and the green magic of plants, more and more, provides a restful background for urban living. Towers, umbrellas, bubbles, stressed beams, exoskeletons, fiberglass, tubular steel, and plastic panels are the shapes and materials for the present and the future. Acres are now cultivated under bubbles of plastic, with tractors and other mechanized equipment used for cultivating and watering the plants year-round under nearly natural conditions. Once again, as with the Victorians, conservatories and gardening are becoming integrated with individual daily lives. Solar heating and greenhouses play an increasing role as the "New Alchemists" and other advanced environmental groups modify our surroundings in ways that combine with Nature. A large leap ahead for the use of greenhouses and plant culture on otherwise inhospitable land must not be far away. As our planet becomes more crowded and new techniques for food and water production, and even for living, must be engineered, the environmentally controlled glass house will have a vast new significance.

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The Organizations of Horticulture

Ernesta D. Ballard

My topic — the history of horticultural organizations, is a tricky one, because most horticultural organizations leave few traces other than their publications. They are, after all, little more than groups of people sharing a common interest. Their speakers may be sprightly or dull; their debates may be spirited or desultory. But when the session is ended, there is usually no permanent record other than the title of the paper presented, and, possibly, the names of the people who attended the meeting.



Ticket issued by the Pennsylvania Horticultural Society to "admit a lady to the weekly meetings," 1870.

Records of horticultural organizations reveal more about horticulturists than about horticulture. They report the names of the people who paid their dues, came to the meetings, took part in the discussion, brought their plants to exhibits, and — let us hope — went home the better for it. They say little about the content of the meetings. Nevertheless, by rummaging in old periodicals and yearbooks, plus an occasional history of the two or three major societies, some idea may be had of what it was that interested our horticultural forebears and why their activities changed from one decade to the next.

The starting point for any retrospective essay in this bicentennial period is, of course, the year 1776, and any bicentennial lecturer worth her salt will begin with a description of the subject as it was when the Declaration of Independence was signed. The library of the Pennsylvania Horticultural Society is a logical starting point to look at the horticultural organizations of two hundred years ago.

What did we find? Not much. The available records fail to show that there were any horticultural organizations in 1776. Or, if there were, they vanished without trace.

What does one make of this? We know that there was much horticultural interest and activity in the colonies. The catalogue of the bicentennial exhibit of our society — titled *From seed to flower* — provides a chronology of significant horticultural happenings, including thirty-five that took place before the Declaration of Independence. The exhibit itself — which I hope all of you have seen — contains two works put out before the Revolution. The earliest, by John Bartram and published in London in 1751, opens with a title-page that tells it all. It reads:

"Observations on the Inhabitants, Climate, Soil, Rivers, Productions, Animals and other matters worthy of notice made by Mr. John Bartram in his travels from Pennsylvania to Onondago, Oswego and the Lake Ontario in Canada. To which is annex'd a curious Account of the Cataracts at Niagara by Mr. Peter Kalm, a Swedish Gentleman who travelled there."

The second pre-Revolutionary text, published as part of the Transactions of the American Philosophical Society in 1771, is Edward Antill's "*Essay on the Cultivation of the Vine and the making and preserving of Wine, suited to the different Climates in North America.*"

Perhaps there are some clues in these two delightful titles. What they are saying is that two centuries ago horticulture had not become sufficiently specialized to support organizations of its own. Plants were still a part of the broad study known as natural history — along with animals, geography, climate, and even people. In 1769, when Benjamin Franklin, John Bartram, and seven other worthies founded the American Philosophical Society, they included among the subjects to be discussed:

"all new discovered plants, herbs, trees, roots, their virtues, uses, etc.; methods of propagating them and making such as are useful, but particular to some plantations, more general; improvements in vegetable juices, or ciders, wines, etc."

It was not until ten years after the Revolution that the first organizations that we would recognize as horticultural in nature came on the scene. These were the societies for promoting agriculture, of which the South Carolina and Philadelphia societies were founded in 1785 and the Massachusetts society in 1792.

To understand the nature of these societies, we must transport ourselves two centuries back in time to a world very different from the one known today. There was no U.S. Department of Agriculture, no hybrid seed, no chemical fertilizers, no insecticides, no soil science; indeed, no science in the modern sense of the word. No one knew how plants grew; no one understood photosynthesis, or transpiration, or genetics. For citizens of the eighteenth century, the culture and improvement of crops and ornamentals followed the same rules depended on for the preceding four thousand years: careful observation, repeated selection, endless trial and error. Rules whose effectiveness were passed on largely by word of mouth.

With the beginning of the nineteenth century there came a change in attitude. Science became the order of the day. There was talk of invention, organization, new methods, experimentation, and radical improvements. All this was the business of the societies for the promotion of agriculture. Their founders were gentlemen farmers caught up in the spirit of inquiry and progress. Their methods included discussions, demonstrations, and above all, premiums — for the best wine, the best flowers, the best fruits, the best vegetables. Among their accomplishments were the establishment, as at Harvard, of a Professorship of Natural History and a botanical garden; and at Philadelphia, the building of the so-called

"Permanent Bridge" across the Schuylkill at Market Street to facilitate the movement of farm produce into the city. In a speech before Congress in 1796, President Washington said that boards should be established

"composed of proper characters, charged with collecting and diffusing information, and enabled, by premiums and small pecuniary aids, to encourage and assist a spirit of discovery and improvement."

He wasn't talking about a department of agriculture; he was talking about agricultural societies.

A few years later, a new group of organizations entered the picture — our own favorites — the horticultural societies. In 1804 came The Horticultural Society of London, later and better known as the Royal Horticultural Society; in 1818 the New York Horticultural Society, not a direct predecessor of the present organization. Then, in a rush, horticultural societies in Pennsylvania (1827), Geneva (1828), Massachusetts (1829), Albany (1829), Charleston, South Carolina (1830), Maryland (1832), Tennessee (1834) (this one was both an agricultural and a horticultural society), Washington, D.C. (1835). And so on and on, with societies springing up in Buffalo, Chester County [Pa.], Chicago, Cincinnati, Dutchess County [N.Y.], Franklin County [Pa.], Galveston, the Genesee Valley [N.Y.], Illinois, Indiana, Kansas, Michigan, Missouri, New Jersey, Ohio, Wisconsin, Worcester, Massachusetts, and elsewhere. *The New York Farmer and Horticultural Repository* of 1828 editorialized thus:

"To see our fellow citizens flocking to the temples of Flora and Pomona, so soon after the recent political strife, is as grateful as music from the still waters of the lake on the subsiding of a storm. We may ever auger well for the perpetuity of our free institutions, when men of talent and influence, freed from the periodical spell of political excitement, unite in cultivating the arts of peace."

Why this proliferation? I cannot say for sure. One suspects it had something to do with the spirit of scientific inquiry mentioned before. Also, our sociologist friends will tell us that the nineteenth century was addicted to societies of all sorts. And doubtless there was some keeping up with the Joneses. As more communities formed horticultural societies, they became more and more fashionable, until no self-respecting community would be without one.

As to the activities of horticultural societies, we can say that they have changed little over the years. In general, the older societies maintain libraries (the Massachusetts Society collection numbers more than 30,000 volumes and is said to be the most comprehensive in the English-speaking world); most regional societies also publish periodicals, ranging from *Horticulture* (published by the Massachusetts Society) and the *Green Scene* (by the Pennsylvania Horticultural Society) to bulletins of local activity; and all of them offer lectures, workshops, clinics (our predecessors would have called them discussions), tours, field trips, and the like. Typically, each has a professional staff, and several (notably Massachusetts and Pennsylvania) enjoy a significant endowment. In some ways their most characteristic activities are exhibits. From the earliest times to the present, horticulturists have enjoyed displaying their handiwork. Records of the older societies include voluminous lists of flowers, fruits, and specimens entered in seasonal shows.

When we go beyond generalizations and look for specific information about individual societies, we find that our knowledge is scanty. Yet it is intriguing to search for tidbits. Thus:

Item. We are told that by the second quarter of the nineteenth century Cincinnati was the horticultural center of the Ohio Valley and the hub of the American wine industry, all as a result of the introduction of the Catawba grape by Nicholas Longworth in 1825. Also, that the Cincinnati Horticultural Society was the clearing house for horticultural information for the entire Middle West.

Item. The first public flower show of any consequence held in America opened in Masonic Hall in Philadelphia in June 1829.

Item. Volume 1 of *The Horticulturist*, published in 1846, reports that the "great autumnal exhibition" of the New Jersey society was to take place "in Princeton in September (day not yet fixed), with a very liberal list of prizes."

Item. In 1837 Andrew Jackson Downing, writing in *The Magazine of Horticulture* with great authority at the advanced age of twenty-two, undertook to review what he called the "State and progress of horticulture in the United States." He opined that the Horticultural Society of Philadelphia (he meant Pennsylvania)

"occupies a large sphere of usefulness, and, through the means of its annual exhibitions, which are thronged with spectators, disseminates a knowledge of the progress of horticulture, and a taste for gardening pursuits through the whole mass of citizens."

That is an apt description of our activities today, one hundred forty years later.

Item. Mr. Downing also made reference to New York (with three "provincial" (his word) societies in addition to the state organization) and Boston (which he allowed was "making rapid strides"). In words with a familiar ring, he deplored the lack of attention to landscape gardening, the absence of the more "delicate" vegetables from the kitchen gardens, and, above all, the fact that not one of the ten leading horticultural societies

"possesses a single acre of land appropriated to the purposes of a public experimental garden."

He would not find the situation too different today on any of these three counts. Records of the Pennsylvania society are full of resolutions to establish a garden — mostly in conjunction with Fairmount Park. Committees and individuals have proposed numerous practical and impractical plans, but the garden has never materialized. It should be noted here, however, that the Massachusetts Horticultural Society did once have a garden — albeit, an unusual one. Early in the nineteenth century it established the Mount Auburn Cemetery, a model for landscaped graveyards. Another is our own Laurel Hill Cemetery here in Philadelphia, which today continues to be a place of horticultural interest and beauty. The sale of Mount Auburn Cemetery provided the basis for the Society's fine endowment.

Item. In 1837 the Pennsylvania Society offered a prize of \$500 (a not inconsiderable sum) for an effective remedy for pear blight. Entries included: soaking the ground with soapsuds; hanging iron in the trees; wrapping the trees with rags soaked in brimstone; driving nails in the trunk as iron tonic; and "physicking" the stones by inserting calomel under the bark. It says something for the shrewdness of our forebears that none of these ideas got the prize. The award was never made.

Item. An article in the first volume of *The Gardener's Monthly* (1859) gave horticultural societies credit for the improved appearance of cities, stating



Laurel Hill by W. Crome and A.W. Graham from *Godey's Magazine and Lady's Book*, 1844

"they [the horticultural societies] have been the means of originating, in many cases, and encouraging in others, the taste for possessing and beautifying suburban residences; and we think that every effort should be made by those who would refine the minds and habits of the rising generation, to extend their healthful influence."

The author continued with a lengthy quotation from a circular of the Pennsylvania Horticultural Society pointing with pride to improvements in vegetable, pomological, landscape and floral gardening; to the improved intelligence, industry, and success of our nurserymen and commercial gardeners; to new and superior fruits and flowering plants; to the extensive and magnificent annual and monthly exhibitions and the large and respectable attendance at same; to the free use of the society's library; and so forth. This modest self appraisal ends with a prediction of what the community may achieve from a cultivated taste for horticulture — being no less than improved moral and intellectual culture; industrious, temperate, and time-saving habits; healthful, rational and delightful amusements; and (so help me) improving, softening, and rendering more pure the dispositions, tempers, and affections of the citizens. As I read that list, it was clear that in the last quarter of the twentieth century we are getting less than we should from our horticultural organizations.

This is a good note on which to end discussion of general horticultural societies and pass on to more specialized groups. Before doing so I should remark that while horticultural societies have had their ups and downs (in 1917 the Pennsylvania Horticultural Society's membership dipped to below 300), they are by no means a thing of the past. By my count there are at least 25 state and regional societies active today, with a combined membership exceeding 50,000. A new one, the Garden State Horticultural Society [in New Jersey] was formed this year. The American Horticultural Society's membership now stands at 29,000. Horticultural societies continue to be a major force in American horticulture.



SCENE AT THE CHRYSANTHEMUM SHOW IN HORTICULTURAL HALL

An 1890's representation of the chrysanthemum show at Horticultural Hall from the Pennsylvania Horticultural Society collection.

Now for specialization

One is tempted to think of specialization as a recent phenomenon, a reaction to the tremendous expansion of knowledge in the twentieth century. And it is true that most single-subject societies have been organized within the last fifty years. But not all; a few go back a century or more, and they are among the most interesting.

The first specialized societies were related to grape growing and wine making. The colonists, understandably, wanted nothing so much as to produce their own wine. They had every reason to think it could be done, especially here in the Delaware Valley where even today our woods are clogged with wild grape vines. Historians report that one of the most effective stimulants to immigration in the early colonial times was the lure of unrivalled opportunity for wine production.

As is well known, it didn't work out. William Penn tried; Franz Pastorius tried; John Bartram tried; Jefferson tried; and a French gentleman named Peter Legeaux tried hardest of all, establishing a vineyard at Spring Mill on the Schuylkill, only a few miles from where we sit. All of their attempts failed for the simple reason that their imported vines (*Vitis vinifera*) of the European wine-grape would not grow here because of their susceptibility to local disease fungi. Today's eastern American grape industry uses plants developed from one (*Vitis labrusca*) found growing naturally in Legeaux's vineyard. But the early vine grower's efforts did bear fruit in the form of at least two horticultural organizations. The first was a state-chartered business promotion organized in 1793 and

named "A Company for the Purpose of Promoting the Cultivation of the Vine," was formed in 1802 and was, I believe, a non-profit organization.

Grapes are not the only source of spirituous drink. Juices from almost any fruit can be fermented and distilled to yield some form of brandy, and the colonists tried them all — from fermented juices to distilled brandies: hard cider, applejack, perry (pear cider), peach brandy, and in a pinch, liquors made from plums, cherries, wild grapes, elderberries, and others. Most families owned stills, and most orchards had cider mills (the base of one may be seen today at Bartram's Gardens). No wonder that pomology figured prominently in the early activities of the horticultural societies — or that it rated at least two specialized organizations of its own: the Ohio Pomological Society formed in 1847, and the American Pomological Society formed in 1850.

The other will-o-the-wisps deserve attention. The first is maple sugar, which gave rise to the short-lived Society for Promoting the Manufacture of Sugar from Sugar Maple Tree, organized in 1795. The second is silk culture. From the earliest days the colonists produced silk in token quantities from silk worms fed on the eastern Asian mulberry (*Morus alba*), but the effort never paid. In 1826, what then was thought to be a different species (*Morus multicaulis* = *M. albus* var. *multicaulis*) was introduced and heavily promoted. The result was a speculation that lasted thirteen years, until the winter of 1839 proved that var. *multicaulis* was not hardy in Philadelphia. Meanwhile, another specialized organization had appeared, the Pennsylvania Silk Society, formed about 1830. It too, was short-lived.

After the flurry of enthusiasm for grapes, fruits, maple sugar, and mulberries, it was a long wait until enough horticulturists shared an interest in a single genus to form an organization devoted to its study. Indeed, it was not until 1890 that the first of the modern plant societies was formed; the subject, chrysanthemums. From that beginning it was another story of proliferation. In 1891 came the American Carnation Society; in 1893 the American Fern Society; in 1899 the American Rose Society; in 1904 the American Peony Society. Then, in chronological order, societies devoted to dahlias, New England wildflowers, orchids, delphiniums, fuchsias, cacti, herbs, plant life, rock gardens, epiphyllums, camellias, penstemons, rhododendrons, hemerocallis, hollies, hibiscus, gloxinias and gesneriads, and others. The list now stands at 57 and is growing. No less than seven such organizations have been formed in the last ten years.

A study of the names and founding dates of these societies, without more, would tell us much about the development of horticultural tastes in various parts of our country. We could, for instance, date the beginning of the American interest in bonsai from the founding of the California Bonsai Society in 1950. Such a study would also raise questions. For example, why are there three iris societies, one devoted to median irises, another to Siberian irises, and a third to the reblooming iris? And why is there no non-professional vegetable society?

I have neither the time nor the expertise to review these organizations one by one. I treat them as a group, noting only that all profess to have been formed for the purpose of stimulating interest in and sharing information about their chosen specialty; virtually all have been in continuous existence since their founding; all support a publication; and all except most professional and a few amateur organizations are open to anyone who cares to join. Most plant societies have a national organization with local or regional affiliates, and a few of the larger ones have professional staffs. The combined membership of all plant societies numbers more than 50,000, perhaps 75,000 persons.

To my thinking, the great contribution of the plant societies in their serious-

ness of purpose. They are not seduced by the modern fads of instant gardening. Their active members know that horticulture demands effort, care, close observation, study, attention to detail, and above all, patience. These characteristics are reflected in their shows and their publications. The articles, while not always in polished literary style, are usually based on the authors' experience, and consequently are respected by amateurs and professionals alike.

In the early days, horticultural organizations were dominated by well-to-do gentlemen, with a smattering of such seedsmen and nurserymen (in this area) as Landreth, Buist, and M'Mahon. All were what we would call amateur organizations. About mid-century the picture changed. At one end, horticulture developed into an academic discipline, largely in response to the establishment of the land grant colleges in 1862. At the other, it developed into an industry, with a vast number of commercial establishments, large and small. While the line between professional people and commercial people is by no means hard and fast, we can now identify some organizations, as the American Society for Horticultural Science, the International Plant Propagator's Society, and the American Association of Botanical Gardens and Arboreta, that are clearly professional. We can also identify many others, as the American Association of Nurserymen, the Society of American Florists, and many more state and regional groups that are clearly trade organizations.

The organizations discussed to this point have been essentially men's groups. The founders of the Pennsylvania Horticultural Society were all men, and when the first women were up for election in 1829, the Society's secretary found it difficult to accept the development. His minutes show erasures to write the names of "ladies and gentlemen" proposed for membership instead of the familiar "gentlemen." He had the same trouble the next month when recording their admission. Even after women became members, their activities were limited to the stereotyped role of social auxiliaries. An 1842 committee report notes that the addition of lady members

"will give a tone and character to the Society, will operate as a check to intemperate discussion, and preserve us from that party spirit [he meant 'partisan'] which too frequently works the downfall of the most popular institutions."

President Caleb Cope struck a similar note in his retirement address in 1859, asserting his conviction that the presence of the ladies had "overawed and suppressed" any tendency toward intemperate discussions, turbulent feelings, or breaches of decorum.

In addition to their function as suppressants of partisanship and as guardians of decorum, the ladies were put in charge of the "social and aesthetic department" of the Society — which apparently meant receptions and parties. It was not until 1919 that women were elected to the Executive Council of the Society, and not until 1973 that a woman — myself — was elected president. Now, in 1976, the Massachusetts Horticultural Society has elected Mrs. John Storey its president. This is not to say that women were not interested and active in horticulture. They were — from the earliest times. Martha Logan, (1704-1779) of Virginia and South Carolina, perhaps the best known, exchanged seeds and plants with Bartram in Philadelphia and Collinson in London, and wrote *The gardener's kalendar*, said to be the first horticultural book published in this country (of which no copy is known to be extant). The secondary role that women played in the organizations of horticulture did not stem from any lack of interest on their part. It was simply a reflection of the subordinate position assigned to them throughout our culture.

But it is a long road that has no turning. In 1889, a group of women took the first small step to right the balance between the men and the women, not by seeking equality in the existing organizations, but by founding an organization of their own — The Cambridge Plant Club. Two years later the first organization that we would recognize as a typical garden club was founded — The Ladies Garden Club of Athens, Georgia. The Garden Club of Philadelphia was founded in 1904, and by 1913 there were enough of these groups to warrant the creation of a national organization, The Garden Club of America. Today there are more than 15,000 women's garden clubs, whose total membership approaches half a million. Practically all belong to one of three national federations: the National Council of State Garden Clubs, composed of 50 state federations with a total of about 15,000 clubs; the Garden Club of America, smaller and less cosmopolitan, with 181 member clubs spread across the continental United States and into Hawaii; and The Women's National Farm and Garden Association, the smallest of the three, with a membership of about 10,000.

From the beginning, garden clubs have taken pride in service to their communities. While their programs have always included activities to improve the gardening skills and knowledge of their members, they have devoted at least as much effort to community beautification, conservation, the development of horticultural therapy, classes in nature study, plant identification, and gardening for children and youth.

In view of their oft-repeated desire for gardens, one would have expected the horticultural societies either to acquire land of their own or to make arrangements for use of space with nearby parks or arborets. But, except for the Chicago Horticultural Society which operates a botanical garden, largely supported by tax money, they have not done so. Instead, the arborets and botanical gardens, which now number at least 125, have organized their own membership groups. There are about 50 of these, generally known as "friends" of the arboretum in question. Their activities have much in common with those of horticultural societies. And so we find organized horticulture in this bicentennial year like Caesar's Gaul — divided into three major parts: horticultural societies, both amateur and professional; specialized subject societies; and garden clubs — most of the large regional and national groups are listed and categorized in the American Horticultural Society's 1971 *Directory*. This division is historical, and I am not sure that it makes sense. We are passing through a period of intense popular interest in green things, which ought to provide fertile ground for organizations devoted to green subjects. Yet our organizations are not expanding in membership or influence. In the case of the plant societies, I suspect this is because they are trying to learn too much about too little. The chapters run out of interesting subjects to put on the agenda. In the case of horticultural societies and public gardens, there has been, so far, an inability to convince civic and cultural leaders — and an inability to convince the great bulk of the citizenry — that horticulture is something more than a humble hobby. In the case of the garden clubs, I think their influence will be limited for so long as they remain primarily women's organizations.

What I would like to see is a true amalgamation, in which there would be umbrella groups corresponding roughly to the horticultural societies, with permanent sections corresponding to the plant societies, and task forces and committees carrying out the projects of the garden clubs. The umbrella groups could be organized by states or regions, with a national federation to provide the kinds of service that are too expensive or too technical for local organizations. In an age of national television, national advertising, and national applications of the com-



Fagus sylvatica on the campus of Swarthmore College. PHS 1976 Symposium.
Photo by Robert A. Salgado.

puter, we need a strong national presence for horticulture. I hasten to add that this structure need not — and to my mind should not — be highly centralized. Quite the contrary. I know full well that, at the level of practical application, horticulture is and always will be intensely local. That is one of its charms. I know also that in horticulture, as in any human endeavor, we derive more sense of accomplishment and satisfaction from participating in small organizations than in large ones. But I am just enough of an idealist to think that we could have the best of both worlds if we put our minds to it. It is something for the American Horticultural Society to work on for the tricentennial.

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The Gardens they Made

George B. Tatum

No occupation is so delightful to me as the culture of the earth, and no culture comparable to that of the garden. — I am still devoted to the garden. But though an old man, I am but a young gardener.

Thomas Jefferson to Charles Willson Peale, 1814

Because it is the product of a leisure class and a mature culture, the pleasure garden — and that is the only kind we are concerned with here — is never found among primitive peoples or upon the frontier. Throughout the seventeenth century, gardens in America existed principally to provide food for the table, condiments for the spice box, and herbs for medicinal use.

Thus a garden such as that Arthur Shurcliff reconstructed beside the Whipple House at Ipswich, Massachusetts, properly contains a variety of plants that the housewife's knowledge of "Physicke" demanded. Some of these were European imports, descended from antiquity and the Middle Ages; some she had doubtless learned about from the Indians. But whatever their source, here one could expect to find plants used as remedies for such diverse afflictions as toothache, whooping cough, loose bowels, worms, snakebite, witchcraft, and "mad dogges." A few were even recognized as aphrodisiacs that "stirreth up bodily lust," while others served more mundanely — and probably more effectively — as cleansing agents, dyes, insecticides, and lotions.¹

And though in his familiar poem Governor Bradford might praise the gardens of Plymouth Plantation for "the fair white lily and sweet fragrant rose," it is well to remember that many of the blooms valued today on aesthetic grounds once had a more practical use. The peony, for example, was thought to have healing powers; a brew made from hollyhock helped void "Stones and gravel"; marigolds in a hot drink could be counted on to reduce a fever;² in fact, herbals like those by John Gerard (1545-1612), John Parkinson (1567-1650), or Nicholas Culpeper (1616-1654) devote considerable space to listing the many "virtues" of both the lily and the rose.

Presumably the plants in most early gardens were arranged in clumps or rows for ease of cultivation. It is tempting to believe that occasionally they may even have been disposed in decorative patterns, simpler versions of the late medieval "knots" illustrated in William Lawson's popular *New orchard and garden* (London, 1648 and thereafter), but admittedly we have no evidence of this. A device that stands a better chance of having appeared early in the colonies is the raised bed in which by the sixteenth century many European gardeners preferred to grow their herbs and flowers. But, however arranged, we may be sure that the seventeenth century garden was located near the house, where it could quickly and easily be visited by the housewife as the need arose.

So far as the plant materials are concerned, there is ample literary evidence to permit the reconstruction of early American gardens, but aside from its historical interest, such an undertaking is not likely to find much favor in modern eyes. For one thing, prior to the nineteenth century and the successful introduction then of large numbers of exotics from Africa, South America, and the Orient, bloom in the garden was apt to be concentrated in the spring and fall of the year; for another, we should miss such present-day favorites as the petunia and the dahlia, while considering as weeds such colonial staples as mustard, burdock, or goldenrod.

Lustgarten und Pflanztungen / Dit wünsamer gierd / artlich er vnd selzamer verimpfung / allerhand Bäume / Breutter / Blü- ten vnd fruchten / Wilder vñ heymischer / Bünslich vnd lust- ig zu zuriçhen / Inhalt volgends Registers.

Wes sich ein Haushütter mit seiner
Arbeit das Jar über / Alle Monat in sonderheit/
halten soll.



Zu Straßburg bei Christian Egenolph.

June's work, in a fifteenth century garden.

This well-known woodcut was engraved in 1530 by Hans Weiditz (fl. 1516-1536) of Strasbourg, and first published by Christian Egenolph (1444-1502) on the title-page of his little gardening book, *Lustgarten und Pflanzungen* (Strasbourg, 1530). One of a series, this view was engraved for the June number of a calendar that Egenolph projected but never completed.

Numerous late medieval prints and paintings attest to the widespread use of the kind of raised bed illustrated here at the left. Whether supported by masonry or by simple wooden planks, these might easily be filled with special soil, were not apt to be trampled upon by man or beast, did not readily overrun the paths, and — not least important — favored the gardener's tired back.

From the copy at the Hunt Botanical Library, Carnegie-Mellon Univ., Pittsburgh, Pa.

Probably the garden backgrounds of colonial portraits are better evidence for the theatrical scenery of the day than for the state of American gardening. But as their builders became more familiar with Renaissance design, the owners of the

principal colonial houses must have demanded gardens of corresponding dignity and elegance. As early as 1736 Thomas Hancock, the successful Boston bookseller, boasted to his London correspondent that he intended to spare no cost or pains in making his gardens both beautiful and profitable. Later in the same letter Hancock continued: "Let me know also what you'll take for 100 small Yew Trees in the rough which I'd Frame up here to my own fancy."³ Hancock's fine house was demolished in 1863, and the view that appeared in *The Massachusetts Magazine* for July, 1789, unfortunately tells little or nothing about the garden.

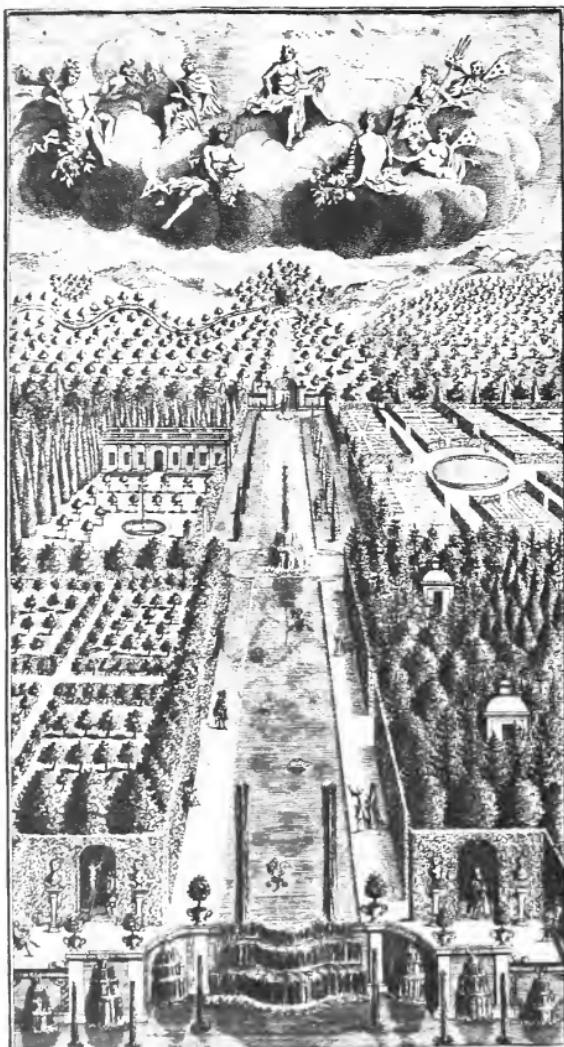
Disappointed in their search for views of this and other major colonial gardens, historians have understandably criticized many restorations as being overly pretentious. In specific cases, such criticism is undoubtedly well founded, but numerous literary references attest to the sophistication and complexity of at least a few colonial gardens. The "ornamental flower beds enclosed in Box" that a visitor to the Hancock house observed about 1806 might have been comparatively simple, but what of the "Squares ... decorated with Marble figures as large as life" that were part of the Boston garden of Joseph Barrell (1729-1804) or the "perfect sample of the taste of Parterres and arbours made of yew clipped into forms" that in 1819 Deborah Logan saw at Belmont, the country seat of the Peters family outside Philadelphia.⁴

Of course it takes more to make a fine garden than parterres or topiary work. One element that can rarely be dispensed with is water. To be sure, since boats provided the customary means of transportation in the eighteenth century, most colonial mansions were sited with a view of bay or river. To this the designer of the garden had only to add one or more of the artificial water devices that had beguiled his predecessors since antiquity. On occasion a simple fountain may have been used, but more frequently water was included as a pool or decorative canal, the latter a form developed from the medieval moat by the French during the sixteenth century and later used effectively by the English and the Dutch. In his Newport garden, Godfrey Malbone, one of the richest merchants of his day, is said to have had three ornamental pools "with silver fish sporting in the water," and on a pool in the Barrell garden, mentioned earlier, four toy ships rode at anchor by way of decoration.⁵ As in the case of the several canals described as being part of Thomas Brattle's garden in Cambridge, these artificial water pieces disappeared long ago, but some impression of their original appearance may be gained from the recreated gardens of the Governor's Palace at Williamsburg.

Here among other features are the "Fish-pond and Falling Gardens" that Alexander Spotswood, governor from 1710 to 1722, thought so important that he professed his willingness to pay for them himself if need be. But soon after the new governor's arrival, the Burgesses did indeed take steps to provide such a garden as he apparently had in mind: while setting a limit of 254 feet by 144 feet on the size of the Palace grounds, the act of 1710 called for this area to be surrounded by a brick wall four feet high, topped by a wooden balustrade, and entered by a "handsome" gate.⁶ The eighteenth century was the age of the gentleman-amateur in gardens as in architecture, and the pleasure grounds of the Palace probably owe much of their original character to Spotswood, whom one contemporary described as "well acquainted with Figures" and skillful "in the laying out of Ground to the best Advantage."⁷ Apart from the Palace, the governor's contribution to the architecture of Williamsburg included the Public Magazine, the scheme adopted for the new Bruton Parish Church, and the design for the rebuilding of the College of William and Mary after the fire of 1705.

When it came to laying out their gardens, the owners of colonial mansions

regularly had the help of European gardeners, often as indentured servants. The taste of both owner and gardener must have been formed, in turn, by what either or both had seen abroad, as well as by the few designs that were illustrated in books available in American libraries of the period. Of these the most widely held seems to have been Philip Miller's *Gardener's dictionary*, first published in London in 1731 and reissued many times thereafter. Like the authors of most such publications, Miller is mainly concerned with horticulture and botany. The often reproduced frontispiece of the second edition (1773) is as near as his *Dictionary* comes to providing aid in the planning of a garden. While such designs were clearly too elaborate to be of much use to colonial gardeners, occasionally, as at the Governor's Palace in Williamsburg, something approaching European models may have been attempted.

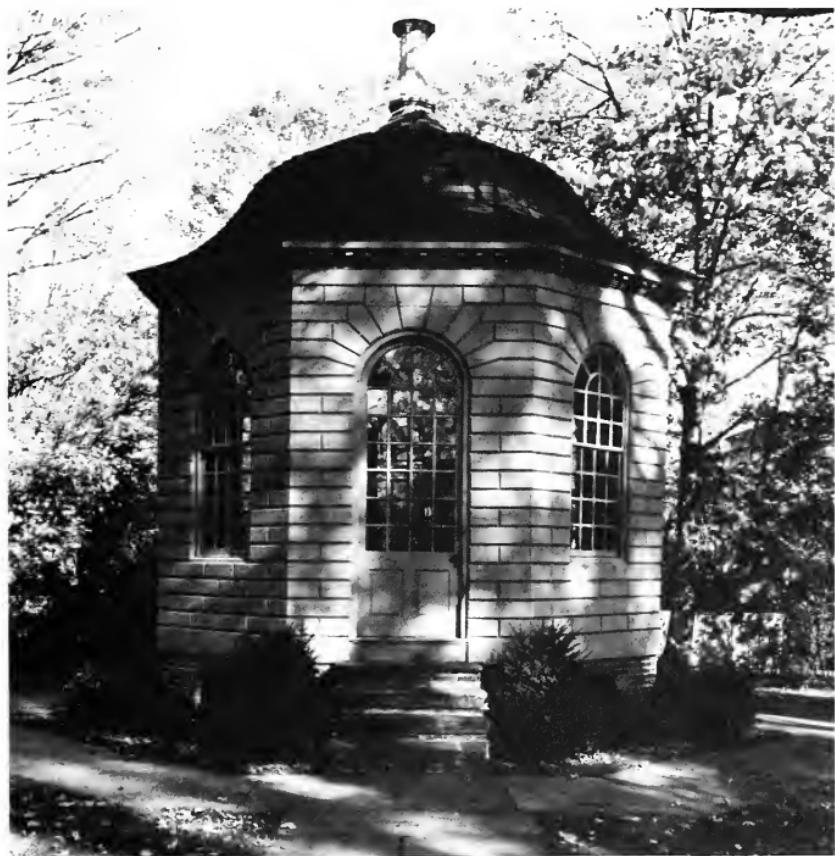


Frontispiece from Philip Miller's Gardener's dictionary, Ed. 2. London, 1733.

Of particular interest is the canal that establishes the central axis in Miller's engraving. Though this is unquestionably French in origin, the compartmentalized quality of the whole design seems to belong more to the Dutch tradition than to the rational manner brought to its height in France under Andre LeNotre (d. 1700). And if the Palace Garden at Williamsburg shares many of these features, this is hardly surprising: Williamsburg is named for William III (1650-1702) who before becoming king of England had been Stadholder of Holland, and close economic and cultural ties had long existed between England and the Low Countries.

Courtesy, The Unidel History of Horticulture Collection, University of Delaware Library.

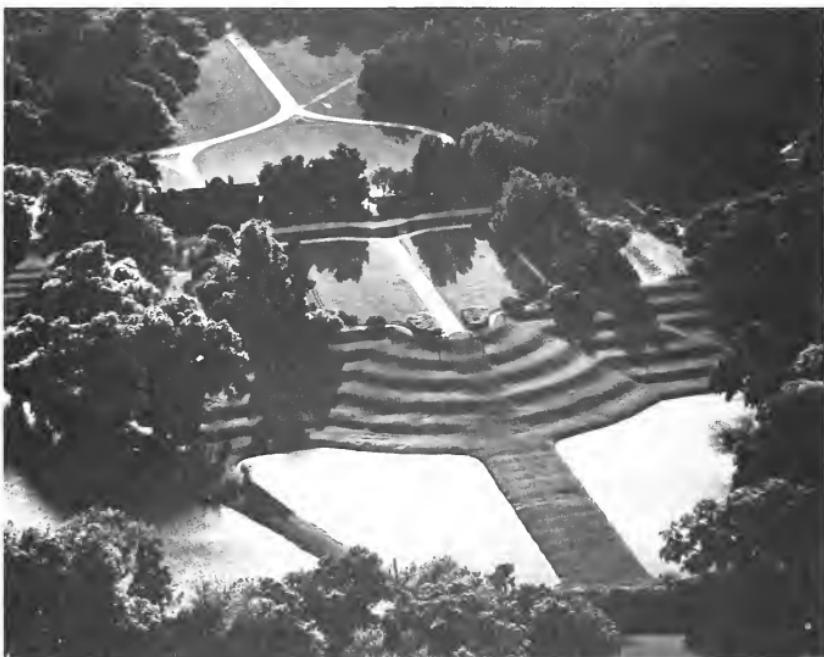
But whatever its specific details, no Renaissance garden could be considered in any way complete that did not include one or more structures that would delight the eye while at the same time providing shelter for some of the activities appropriate to the time and place. As in the case of Barrell's garden or that at Belmont, such architectural embellishments were most often described as being in the "Chinese" taste. In Europe, garden structures of this kind were often very substantial indeed, but a curved roof or a Chippendale railing was probably as near to being Oriental as most colonial buildings were likely to come. And because they were usually built of light materials that stressed economy and effect over stability and permanence, few eighteenth century "summerhouses" survive today.⁸ Of these the most notable are unquestionably the one provided by Samuel McIntire (1757-1811) about 1793 for Elias Hasket Derby's farm at Danvers, Massachusetts, and that designed by Peter Harrison (1716-1775), Newport merchant and gentleman-architect, for the country estate of his friend Abraham Redwood.



Summerhouse. Designed (c. 1768) by Peter Harrison for Abraham Redwood's Redwood Farm in Portsmouth, R.I. The structure was removed in 1917 to the grounds of the Redwood Library, Newport, R.I.

Though the roof might appear vaguely Oriental to some, Harrison's summerhouse had a source much closer to home; Plate 80 in *A book of architecture* by James Gibbs (1682-1754), designer of St. Martin-in-the-Fields, among the best known of London churches. *Photograph from the Historic American Buildings Survey.*

In America the early abolition of entail and primogeniture, whereby estates might be passed down intact to the eldest son, as in Europe, has combined with the growth of an industrial society to bring about the destruction of most of the early gardens. A few have been re-created with some success, as at Williamsburg; a few others that have descended in the same family have retained faint vestiges of their former grandeur, as at Sabine Hall (begun c. 1730) or Mount Airy (1758), both in Virginia. And of course near Charleston, South Carolina, are the gardens of Henry Middleton on which a hundred slaves are said to have labored for a decade to create the extensive lakes and terraces still enjoyed by thousands of visitors every year. But wherever located, all the major gardens of the eighteenth century illustrate the Renaissance practice of continuing into the surrounding site the geometric lines of the building, especially its central axis. And since these "architectural gardens" depend for their effect upon our experiencing the symmetry of the design, elevated points were provided from which the spectator might view the garden to advantage. The windows of the principal apartments usually afforded one such opportunity. The uppermost terrace adjacent to the house offered another.



Aerial view of Middleton Gardens, begun 1741, showing the terraces and "butterfly" lakes. . In creating over sixty acres of lakes and gardens, Henry Middleton (1770-1846) is said to have had the assistance of an English gardener. Originally the main axis of the garden led directly from the Ashley River to the garden entrance of the large three-story mansion, burned by Union troops during the Civil War. Henry Middleton served as president of the First Continental Congress and his son Arthur signed the Declaration of Independence.
Courtesy, R. Alan Powell.

Since many Georgian plantations were built on high ground overlooking a river, it was relatively simple to lay out a garden as a series of terraces, or "falls," that descended from the house to the water. Most of the Virginia gardens noted previously were of this type, and in Maryland remnants of such terraces may be

seen at the Ridout house (c. 1765) in Annapolis and especially at Tulip Hill (begun 1756), the delightful Georgian plantation that overlooks the West River about ten miles to the southwest. Thanks to the Garden Club of Philadelphia, we can also gain some idea of the terraces that originally descended from the west front of Mount Pleasant (begun 1761) toward the Schuylkill River. In the south, sod ramps usually provided the transition from one terrace to another, but in New England, stone steps were probably more common. Those in the Boston garden of Peter Faneuil are said to have been made of "brown granite," the same material that was used for the massive retaining wall of Faneuil's terraces, at least one of which was surrounded by a highly-wrought iron railing, surmounted with gilded ornamental balls.⁹



Tulip Hill, overlooking West River, near Annapolis, MD. Main house built for the merchant-planter Samuel Galloway about 1756.

Though reinforced or reconstituted in the present century, the falls or terraces that here descend from the house to the river give some idea of the colonial garden of a typical Maryland plantation. Sod ramps doubtless led from one level to the next and rows of fruit trees probably framed the whole. The Galloways named their plantation for the flowers borne by the poplars that still surround it.

Courtesy, Mr. and Mrs. Lewis R. Andrews. Photo by Marion E. Warren.

The origins of formal designs of this kind may be traced at least as far back as the villas of fifteenth century Florence, from whence, through trade and conquest, the Italian style of gardening passed to France. There it combined with the medieval moat to form the distinctive canal-garden with its broad terraces and embroidered parterres. Late in the seventeenth century this Franco-Italian garden, in its turn, was diffused throughout much of western Europe, where it remained fashionable well into the eighteenth century.

For their gardens, the English were the first to tire of the formal Renaissance style that had dominated Europe for nearly three centuries. Not only did the cool,

moist climate of the British Isles encourage the substitution of grass and trees for the parterre with its designs of colored stones and clays, but the love of Englishmen for walking outdoors was ill served by the sunlit expanses of the French garden, intended from the first to be viewed from above, rather than to be wandered through. This lack of sympathy with things French was also reinforced by what could be seen in Italy in the course of the Grand Tour. There many of the Renaissance gardens had become overgrown and, even more important, there might be seen the landscape paintings of such artists as Claude Lorrain (1600-1682) and Gaspar Poussin (1615-1675) to suggest how appealing Nature might appear when seemingly untouched by the hand of man.

On returning to their own country, not a few Englishmen sought to remake their own parks and gardens into something resembling the pictures they had seen (and perhaps acquired) abroad. In gardens such as Henry Hoare's Stourhead (c. 1750) in Wiltshire, we recognize at once the irregular lake, the classical temple, and the inevitable bridge that were the stock-in-trade of the painters of classical landscapes. This practice of designing gardens to resemble paintings explains such familiar terms as "landscape gardener" (*i.e.*, one who uses landscape paintings as his models); and of course "picturesque" (*i.e.*, literally "like or suitable for a picture").¹⁰

The abolition of the parterre, the development of the persistent curve, and the studied informality of what now came to be known as the English (or Natural) style was also influenced by the asymmetry and evocative qualities the English detected — or thought they detected — in the Chinese gardens then coming to the attention of Europe. On the Continent, especially in France, the English garden was often referred to as being in the "Anglo-Chinese" style. In France, too, a desire to escape from the Grand Manner of the Age of Louis XIV (d. 1715) had expressed itself in the playful rococo forms of the style of Louis XV (d. 1774), and perhaps, as some have suggested, we should regard the curvilinear elements of the landscape garden as to some extent a kind of "English Rococo."

Nor was it thought a coincidence that the same country that gave the world the landscape garden was also known as the "Mother of Parliaments." With the exception of the poet Alexander Pope (1688-1744), most of the early advocates of the new style were Whigs who favored closer political ties with democratic Holland. In France, when Jean-Jacques Rousseau (1712-1778) proposed a "return to Nature," the authorities were entirely correct in condemning his writings as antimonarchist. Freedom of artistic form thus became linked in men's minds with freedom of political thought. With the other qualities of the English garden, we should therefore also include the fact that it was the garden of liberalism.¹¹

In England the landscape garden reached its mature phase between 1760 and 1780 when Lancelot Brown (1715-1783) reduced the somewhat vague concepts of his predecessors to a set of definite principles that he applied perhaps too uncritically in arriving at innumerable designs for his countrymen. The nickname "Capability" by which Brown is usually known is but evidence of his success in convincing others that he should be permitted to realize the "capabilities" for improvement he invariably discovered in any garden or park about which his advice was sought. Brown seized upon the principle popularized by Hogarth (*The analysis of beauty*, 1753) that the curve is the most beautiful of lines; under his hand, paths and water courses were made to wind and the surface of the ground to undulate. The terrace was now suppressed as being too formal and the deer in the park were permitted to graze near the house. Flowers were essentially banished from the English garden, though the individual tree was given a new importance. But Brown's faults should not be permitted to obscure his virtues: the

English countryside, so universally admired, probably owes its distinctive quality almost as much to his influence as to Divine Providence. It was Brown's misfortune to be remembered least where he succeeded most.¹²

Americans traveling in Europe must have noted the new style in gardening that was taking form between about 1720 and 1750, and soon at least faint traces might be detected on this side of the Atlantic. From London, Richard Stockton — one of the signers of the Declaration of Independence — wrote his wife Annis at Princeton, New Jersey, about 1767: "... I design to ride to Twickenham ... to view Mr. Pope's garden and grotto ... and ... I shall take with me a gentleman who draws well to lay down the exact plan of the whole."¹³ By the standards of today, Pope's grotto seems distinctly artificial, but when built shortly after 1719 it was one of the first manifestations of the new taste in garden design, as its owner had been one of those who took the lead in condemning the formal Renaissance style. Stockton's interest in the grotto was prompted by his hope to build a copy of it at Morven, his home in Princeton. For this purpose he collected such curious items as a Roman brick from the top of Dover Castle, a piece of wood from the five hundred-year-old effigy of Archbishop Peckham at Canterbury, a piece of the King's coronation chair and—perhaps most important—"the best cement for sticking shells in a big way."¹⁴ At least some of Richard and Annis's plans for their grounds at Princeton may have been realized, but later generations of Stocktons continued to alter the garden until no trace of a grotto remains.

The Stocktons were among the first Americans to attempt the importation of the new style of gardening, but others were also aware of the changes in taste that had been taking place in England since early in the eighteenth century. To judge from the background in his portrait by Charles Willson Peale, one of these was William Paca (1740-1799), the patriot jurist of Annapolis who would later sign the Declaration of Independence and serve as governor of Maryland from 1782 to 1785. Early in the twentieth century what remained of Paca's house and garden was absorbed or obliterated by a hotel. When this was demolished in 1965, archeologists uncovered substantial sections of the original surrounding wall and the location of several terraces that had descended from the house to a small lake at the foot of the garden. Around the irregular banks of the lake Paca apparently intended to have the kind of winding garden paths then popular in England and for which eighteenth century designers considered they had ample antique precedent. When describing his Tuscan garden had not Pliny the Younger (A.D. 62-113) praised both its formal aspects and also "the negligent beauties of rural nature" it displayed?

By 1771 Thomas Jefferson was noting in his Pocket Account Book some of his plans for landscaping Monticello in the English style. These called for a cascade to fall from several levels and for a temple with "an Eolian harp." In place of the usual English deer park, Jefferson had in mind something more American: "Procure a buck-elk," he wrote, "... but keep him shy, that his appearance may not lose its effect by too much familiarity. A buffalo might perhaps be confined also." Elsewhere in the garden there were to be a variety of inscriptions carved on the bark of trees or engraved on metal plates and "suited to the character or expression of the particular spot."¹⁵ Doubtless with these improvements in mind, Jefferson in 1786 made a tour of the English gardens, using as his guide Thomas Whately's popular *Observations on modern gardening*, first published in London in 1770.

But old customs die slowly, and in America the formal garden was not to be driven out overnight by the newer landscape style. As late as 1796 a parterre might still be seen at Mount Vernon, for from that year we have the comments of

Benjamin Henry Latrobe (1764-1820), the English architect newly arrived in America, who was later to have a major role in the building of the Capitol and the President's House in Washington. Concerning the gardens at Mount Vernon, Latrobe wrote: "For the first time since I left Germany I saw ... a parterre striped and trimmed with infinite care into the form of a richly flourishing fleur-de-lis, the expiring groan, I hope, of our grandfathers' pedantry."¹⁶ On the basis of this and other early references, the pleasure gardens at Mount Vernon have been recreated with parterres of box and gravel.

Washington's orangery is also a rebuilding, but there is no doubt that in a number of the finest colonial gardens Renaissance forerunners of the modern greenhouse were used to provide points of visual interest and to protect tender plants ("greens") during the cooler months of the year.¹⁷ Ruins of one such structure survive at Mount Airy, for example, and there is a well-preserved orangery at Wye, the Lloyd estate in Talbot County, Maryland.



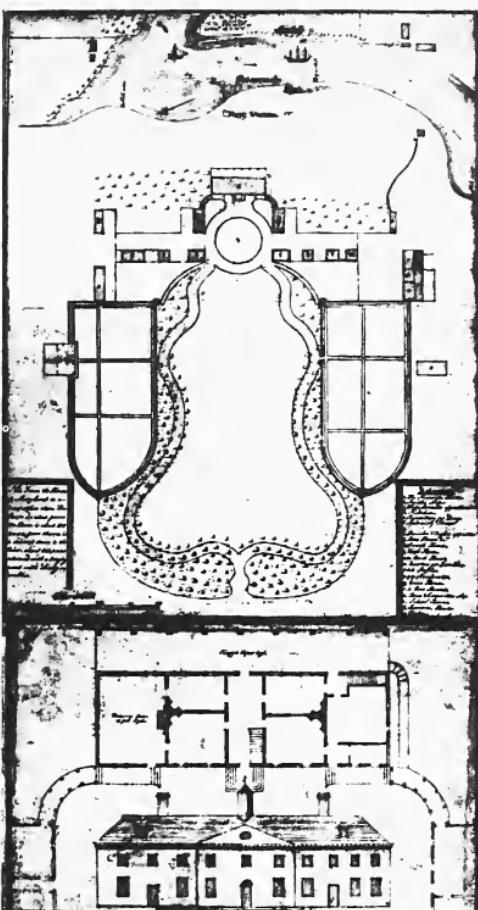
Orangery, Wye Plantation, Talbot County, Maryland.

Though this is the finest example to survive, most colonial gardens of any importance must have had at least one such structure. By the use of stoves it was possible to promote growth as well as to afford protection, and in England before the close of the seventeenth century oranges in quantity were being brought to full maturity in this way. From such comparatively simple origins evolved the more ambitious greenhouses of the following century. Of these, probably the most elaborate ever built in America was that at Lyndhurst in Tarrytown, New York. This was begun before 1870 for George Merritt and enlarged after a disastrous fire in 1880 by the railroad tycoon Jay Gould. Together with the mansion and other dependent buildings, what remains of the greenhouse at Lyndhurst is now a property of the National Trust for Historic Preservation.

Photo by Jack Boucher for the Historic American Buildings Survey.

Apparently not all the grounds at Mount Vernon were laid out in the conservative style that attracted Latrobe's criticism; ten years earlier Washington had recorded in his diary details of what he referred to as the laying off "of the Serpentine Road,"¹⁸ by which he presumably meant the drive that exists today in front of the house. Much of what is known about this, as well as about other

aspects of the grounds at Mount Vernon in Washington's time, comes from a detailed drawing by Samuel Vaughan, a well-to-do Jamaican sugar planter, who



Plan of the grounds as Mount Vernon. Drawn in 1787 by Samuel Vaughan, ink highlighted by watercolor on paper, 32 by 16 inches.

Mount Vernon had been in his family for several generations when George Washington took possession in 1752. As a guide in developing his garden, Washington relied on Philip Miller's *Dictionary* and Betty Langley's *New principles of gardening* (London, 1728). In front of the house he planned a bowling green and in the confined spaces between the drive and the wall of the adjacent gardens a "Wilderness." When acknowledging receipt of Vaughan's plan, Washington noted a few errors in detail, while praising the whole for its "accuracy."

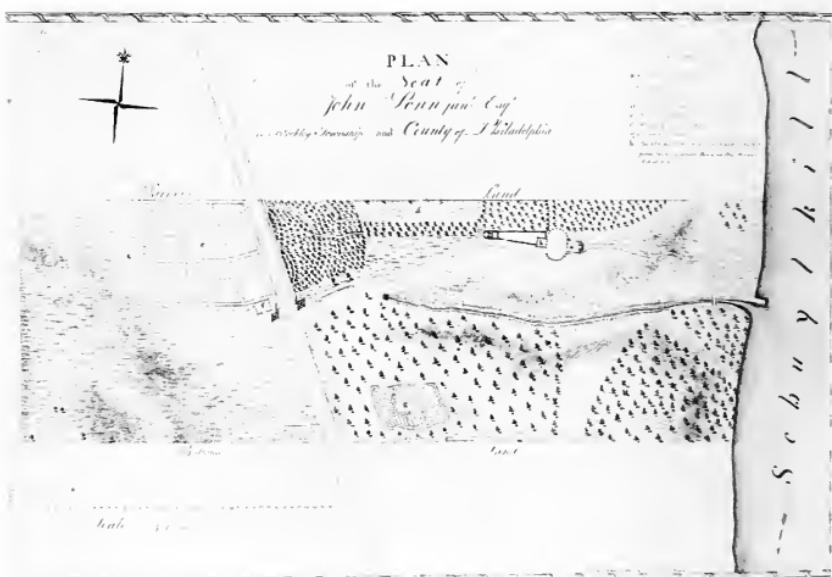
Courtesy, The Mount Vernon Ladies' Association of the Union.

following the Revolution took up residence in Philadelphia and there emerges as something of an amateur designer of gardens. At least, about 1784 he seems to have directed the planting of the area behind the State House (Independence Hall), for which we have a description made three years later by the Rev. Manasseh Cutler:

...here is a fine display of rural fancy and elegance [Cutler wrote]...The trees are yet small, but most judiciously arranged. The artificial mounds of

earth, and depressions, and small groves in the squares have a most delightful effect. The numerous walks are well graveled and rolled hard; they are all in the serpentine direction, which heightens the beauty and affords constant variety. That painful sameness, commonly to be met with in garden-alleys, and other works of this kind, is happily avoided here, for there are no two parts of the mall that are alike. Hogarth's 'Line of Beauty' is here completely verified.¹⁹

Vaughan may well have seen some of the more successful English gardens before coming to America, and that was certainly the case with other immigrants such as John Penn, the bachelor grandson of the colony's founder. Shortly after his arrival in 1785, Penn built the delightful little retreat he called "The Solitude," which still stands in the grounds of the present Zoological Gardens in Philadelphia. And though nothing remains of the gardens, we may form some idea of their character from the remarkable drawing that has survived as one of the very few contemporary plans of a garden of this period.



Grounds of The Solitude, countryseat of John Penn, now in Fairmount Park, Philadelphia. Surveyed and drawn by John Nancarron 19 1/16 by 28 5/16 inches.

When planning the grounds of his retreat about 1785, Penn was careful to provide a vista of the river, a bowling green (d), and a wilderness (c). A flower garden (g), laid out in irregular beds and located some distance from the house, was approached by a circuitous path bordered at one point by an "ah-ha" (h), a ditch used to confine animals and named from the exclamation of surprise made by the visitor who came upon it unprepared. A device favored by Brown and his followers to eliminate the use of fences, which they considered to be unnatural, an ah-ha (ha-ha) may still be seen in such American parks and gardens as Mount Vernon and Middleton Place.

Courtesy, The Historical Society of Pennsylvania.

Like many another gentleman, Jefferson seems to have designed most of his garden. In 1771, he wrote to Glasgow in search of a gardener who would work for ten to fifteen pounds a year, indentured for five years. And indeed many of

the early gardens in America were designed and maintained by Scottish, Irish, English, and German immigrants of varying ability and experience. Of these the most talented was unquestionably the French *émigré* Joseph Jacques Ramée (1764-1842), who came from France in 1811 at the invitation of David Parish, second of five sons of a successful merchant-banker whose headquarters were in Hamburg. On his way to Philadelphia from the Parish properties along the St. Lawrence River, Ramée passed through Schenectady, New York, where he was engaged by President Eliphalet Nott to design a new campus for Union College.²⁰ It is fortunate that Ramée's design has been preserved, for it is probably the first unified college plan in America (and may later have influenced Jefferson's ideas for the University of Virginia) as well as an early example of the English park in this country.

After his return to Europe in 1816, Ramée published a few numbers of what was intended to be a large and comprehensive volume dealing with "irregular gardens" and country houses. Copies of Ramée's book are extremely rare, and there is no reason to suppose it influenced the design of American gardens. But other books published in the United States had begun to take notice of the changes in taste that had long been evident abroad. One of these was Bernard M'Mahon's *American gardener's calendar* (1806), in which, under the heading of "The Pleasure, or Flower Garden," the author dealt with the landscape style of gardening. Apart from the frontispiece, M'Mahon's book contains no illustrations, and his literary style is somewhat turgid and complicated. Nevertheless, the *Gardener's calendar* went through many editions, and since it may well contain the first discussion of the landscape garden published in America, it deserves mention here.

In spite of the considerable amount of space he devoted to the landscape garden, M'Mahon seems to have regarded himself essentially as a nurseryman, rather than as a landscape gardener. This was not the case, however, with André Parmentier (1780-1830), who in 1824 had come from Belgium to Brooklyn and there established one of the earliest and most important nurseries in New York state. Four years later Parmentier contributed a brief notice on "landscape and Picturesque Gardens" to Fessenden's *New American gardener*. For Parmentier, at least, the advantages of the landscape garden were self-evident:

... where can we find an individual, sensible to the beauties and the charms of nature [he asked his readers] who would prefer a symmetric garden to one in modern taste; who would not prefer to walk in a plantation irregular and picturesque rather than in those straight and monotonous alleys bordered with mournful box, the resort of noxious insects?

In addition to writing briefly on the landscape style and developing his nursery in Brooklyn, in the six years that Parmentier spent in this country before his death in 1830, he is said to have laid out the grounds of a number of large estates along the Hudson, most notably the grounds of Dr. David Hosack, called "Hyde Park," which unfortunately no longer survive.

This and the gardens of such other great houses as Montgomery Place, home of the hero of Quebec, aroused the enthusiasm and admiration of Andrew Jackson Downing (1815-1852), a young man born and reared in nearby Newburgh. In 1841, when only twenty-six years old, Downing published the first book by an American devoted entirely to the subject of landscape gardening, *Treatise on the theory and practice of landscape gardening adapted to North America*. The success of the work was astonishing, considering the subject and the age of the author; excluding modern reprints, it went through at least ten edi-

tions (the latest in 1921), and almost overnight Downing found himself a kind of arbiter of American taste.

When the *Treatise* was first published, Downing, with his brother Charles, was managing the Newburgh nursery established by their father.²¹ For the principles of landscape design Downing turned to English writers on architecture and garden design but illustrated his remarks with wood engravings of American houses and gardens he considered especially worthy of note. As examples of the formal style he recommended Judge Peter's Belmont and Henry Pratt's Lemon Hill, both in the environs of Philadelphia. The more modern "English" or "Natural" style he found most beautifully expressed at another Philadelphia estate, William Hamilton's Woodlands, and at the Theodore Lyman villa at Waltham, Massachusetts. The Woodlands is now a cemetery of that name, but The Vale, as the Lyman estate was called, is today one of the properties of the Society for the Preservation of New England Antiquities. Reputedly laid out about 1793 by an English gardener named William Bell,²² the park at The Vale retains vestiges of the fine trees and the picturesque stream that so appealed to Downing and his contemporaries.

In his fascinating diary, a Philadelphia Brahmin named Sidney George Fisher (1809-1871) described how Downing went about the eastern seaboard giving gardening advice. Under date of November 5, 1849, Fisher noted:

On Thursday drove out to dine at Fisher's [Joshua Francis Fisher, Sidney George's cousin] to meet Downing, the landscape gardener who was there for a few days to help him lay out the grounds of his place. Edward Middleton there too. Came in at 10 after a pleasant conversation & good dinner. Engaged Downing to give Henry [Sidney Fisher's brother] a few hours on Saturday to determine the site for his house. ... Downing goes in this way to give advice, professionally. His charge is \$20 per diem.²³

Earlier, Fisher had remarked that he considered it "an indication of some advance in refinement that a 'landscape gardener' [could] find employment, & constant, profitable employment, in this country."²⁴ The contribution of Downing to the Philadelphia scene is hard to judge, however except possibly for a few of the fine trees at Alvathorpe, formerly the Jenkintown estate of the Lessing Rosenwalds, nothing remains of the houses or the grounds about which the Fishers sought his advice.²⁵

Another of the gardens in the Philadelphia area for which Downing may have served as consultant is that of the Read House in Newcastle, Delaware. George Read II began his fine late Georgian mansion about 1797, but the present garden was not laid out until 1847, after the burning of the adjacent house in 1824 had provided the necessary space. The brick surfaces of the serpentine paths at the rear of the Read House are modern, but the concept of a formal flower bed near the street may well have been a part of the original design. On this point Downing advised his readers:

Where the flower-garden ... is attached directly to the house, we think the effect is most satisfactory when the beds or walks are laid out in symmetrical forms. Our reasons for this are these: the flower garden, unlike distant portions of the pleasure-ground scenery, is an appendage to the house, seen in the same view or moment and therefore should exhibit something of the regularity which characterizes, in a greater or less degree, all architectural composition....²⁶

Obviously beds of this kind have nothing to do with the Natural Garden as understood by Capability Brown and his followers, but they are very much in the

spirit of Brown's principal successor as the leader of the English school of garden design. This was Humphry Repton (1752-1818), who agreed with those of his contemporaries who thought that in his pursuit of Nature, Brown had gone too far in eliminating the flower bed and other formal elements from the garden.²⁷ Boredom with Brown's designs now helped inspire a shift in emphasis but so, too, did improved methods of transportation that made it possible to import exotics from distant places and in ever-growing numbers. Beginning about 1790, greater emphasis began to be placed on the individual plant; the terrace and the kitchen garden were gradually returned to their former places beside the house; and convenience and utility were increasingly given preference over picturesque or natural effects. Predictably, Jefferson was among the Americans persuaded by Repton's reasoning, and about 1807 he designed for Monticello the serpentine, gravel walk bordered by flower beds — the so-called "roundabout" — that has been restored by the Garden Club of Virginia.



Headpiece to Chapter VII of Frank J. Scott's Suburban home grounds (1st ed. 1870).

The author advised his readers to preserve some unbroken stretches of lawn; to plant with a view to opening vistas to and from the house; and to place the largest trees around the periphery of the property, with the smaller specimens in front. In an effort to make the house blend with its setting, Victorian designers regularly used foundation planting in a variety of forms, and Scott further stressed the desirability of selecting devices to mark the boundaries of the property that were as inconspicuous as possible.

. In England Repton's biographer, John Claudius Loudon (1783-1843), proposed that the new style be called "The Gardenesque," and though that name never became popular in the United States, the writings of Loudon and his wife Jane were widely read and admired by Downing and his contemporaries. The later development of the Gardenesque into the somewhat spotty planting that typically surrounded the American house during the Victorian period may readily be followed in such publications as those of Frank J. Scott (1828-1919) or F.R. Elliott (1817-1878).²⁸

While the site of the individual house was being developed along these lines, attention was also paid to larger areas of a more public kind. Americans of the mid-nineteenth century were generally committed to the view that environment to a large extent determines human behavior and personality: to improve the character of a man, it was only necessary to improve his surroundings. As the landscape garden grew in favor, it thus came to be employed as the setting of the new hospitals for the insane, in the establishment of which America took the lead. When used in this context, it was expected, of course, that the serenity and beauty of the setting would be reflected in the mental condition of the patients.²⁹

This concept of the beneficial effects of environment was applicable quite as much to the well as to the ill. Of all environments, none was thought to be so beneficial as rural nature, especially when its beauties had been improved and heightened by the hand of a competent landscape gardener. This is Rousseau's "return to nature" that had earlier motivated Marie Antoinette in her fondness for her make-believe hamlet at Versailles. But that which in the eighteenth century had been the pastime of the aristocracy, became in the nineteenth the serious pursuit of the common man. Again and again writers of the period defined the purpose for which men labor in the city as the accumulation of sufficient wealth to retire someday to the country.

In pursuit of this ideal, some Americans had a home in the country, as well as one in the city. For many people, however, this was not possible, and a solution was sought in the romantic suburb, which attempted to combine nearness to an industrial city with the rural surroundings of the country. The first such suburb is usually considered to be Llewellyn Park at West Orange, New Jersey, created during the mid 1850s for the successful drug importer Llewellyn S. Haskell (1815-1872).³⁰ But Evergreen Hamlet at Millvale, near Pittsburgh, Pennsylvania, was also established about this time, and after the Civil War a number of American cities could point to one or more new suburbs.

The landscape style also found extensive use in the "rural cemeteries" that in the 1830s and 1840s were being established near the major American cities: Boston had its Mount Auburn (1831) in Cambridge; Philadelphia had its Laurel Hill (1836) outside the city limits on the banks of the Schuylkill River; and New York had its Greenwood (1839) in Brooklyn. Of these earliest and most important cemeteries, only Laurel Hill was planned by someone with professional training in design. This was the Scottish architect John Notman (1810-1865), later commissioned to develop a plan for Hollywood Cemetery to serve Richmond, Virginia.³¹ In 1845 Notman also provided the first plan for Spring Grove Cemetery in Cincinnati, Ohio, but later this was substantially altered by Adolph Strauch (1822-1883), a Prussian-born landscape gardener, who became Superintendent of the cemetery in 1855.

Today most of these early cemeteries are crowded with a miscellaneous collection of sepulchral monuments, but when first laid out, they held inviting opportunities for an afternoon stroll, free from the noise and confusion of the city, yet near enough to be readily accessible. Rural cemeteries were, in fact, the first extensive public parks in America, and so popular did many of them become that the managers found it necessary to pass various regulations limiting those admitted as well as the activities in which they might properly engage.

Downing was sufficiently impressed by the use the Americans made of the rural cemeteries that he joined William Cullen Bryant (1794-1878) in advocating the establishment in New York City of a public park to contain not less than five hundred acres. Both his early championship of such parks and his position

as the leading American writer on horticultural subjects made Downing the logical choice to plan the Public Grounds that Congress wished to establish in the large L-shaped area that stretched from the Capitol to the White House. Originally intended by its designer, Pierre-Charles L'Enfant (1754-1825), as the site of monumental avenue linking the Legislative and Executive branches of the government, by 1850 this unimproved area was recognized as being so low and swampy that it constituted not only an eyesore but also a threat to the health of the president and his family. As accepted by President Fillmore in 1851, Downing's design for the Public Grounds in Washington may be regarded as the first public park in America, apart from the colonial square or common.



Washington, D.C., with the projected improvements of the Public Grounds as designated by A.J. Downing. Colored lithograph drawn by B.F. Smith, Jr. Published 1852.

In the notes that accompanied his plan, Downing cited as one of his principal objectives the desire to form "a public museum of living trees and shrubs," and a didactic strain is present in much nineteenth-century thought. Later, when New York finally adopted a scheme for Central Park, museums of art and natural history were included on its periphery.

Courtesy, the Library of Congress.

Not until nearly five years after Downing's death did the park he had advocated for New York City become a reality. One of the two authors of the winning design was appropriately Calvert Vaux (1824-1895), the English architect who in 1850 had come to the United States as Downing's architectural assistant and partner. Vaux's contribution to the plan of Central Park is presumed to have been principally the architectural features; the landscape design was largely the work of Frederick Law Olmsted (1822-1903), who thereby emerged as the leading American practitioner of a profession he was the first to call "landscape architecture."³² During the next half-century, alone and in partnership with others, Olmsted designed many of his country's major parks, including Prospect Park in Brooklyn, New York (1870); Franklin Park in Boston, Massachusetts (1885); and Jackson Park (1895) overlooking Lake Michigan in Chicago, Illinois.³³ Also near Chicago is Riverside, laid out by Olmsted and Vaux in 1869 as one of the earliest suburbs west of the Alleghenies and one that is still attrac-

tive despite the additional houses that have been built on most of the larger lots. But the principal practitioner of the emerging profession of landscape architecture in the midwest was H.W.S. Cleveland (1814-1900), whose commissions included the park system of both Minneapolis and Omaha, Brookside Suburb in Indianapolis, and Washington and South parks in Chicago.³⁴

Here, too, should be mentioned Jacob Weidenmann (1829-1893) with whom for nearly a decade Olmsted was associated in a number of commissions, beginning in 1874. A Swiss by birth, Weidenmann had received his architectural training in Munich before coming to Hartford, Connecticut, where he had a part in the design of Bushnell Park and in the promotion of Cedar Hill Cemetery.³⁵ In time, Olmsted's success also attracted a number of apprentices, who included his nephew (and stepson) John Charles Olmsted (1852-1920), his own son, Frederick Law Olmsted, Jr. (1870-1957), and Charles Eliot (1859-1897), son of a president of Harvard University. Though a talented landscape architect, and after 1893, a partner in the firm that Olmsted had formed with his nephew, Eliot is remembered by historians principally as a perceptive writer on many of the questions confronting his new profession, for his promotion of the Metropolitan Park System in the Boston area, and as the person in whose memory Harvard established in 1900 the first university course in landscape architecture.³⁶

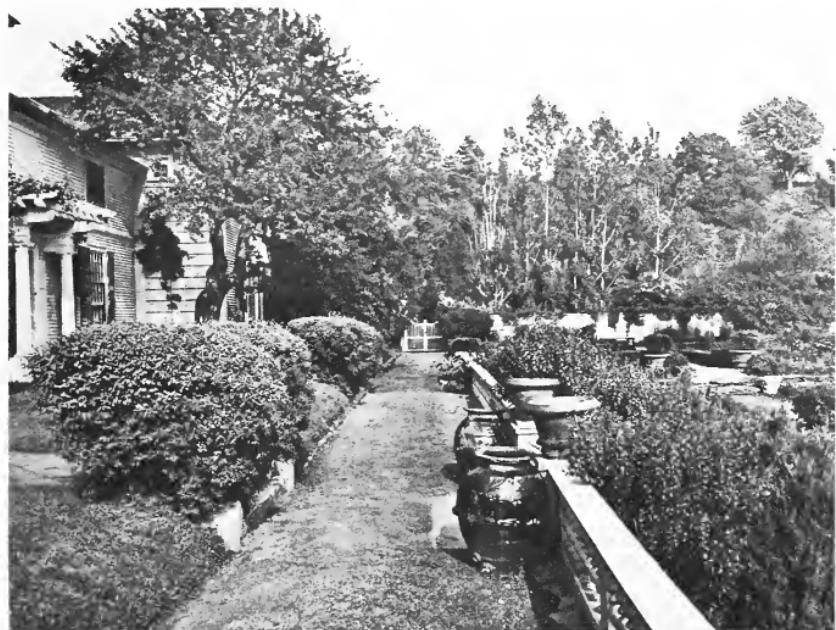
Throughout his career, the senior Olmsted continued to prefer the softer and more natural forms that were an outgrowth of the earlier English style of gardening, but any doubt concerning the public's willingness to accept greater formality in the design of buildings and their settings should have been dispelled by the enthusiasm that greeted the Columbian Exposition, held at Chicago in 1893. For this, Olmsted and his associates employed a system of lagoons to unify and enhance a classical plan that has been widely acclaimed by critics, then and now. Largely as a result of the success of the Columbian Exposition, Congress celebrated the centennial of the establishment of the city of Washington by authorizing a return to L'Enfant's baroque plan for the Mall. The Senate Park Commission of 1901 permitted the Ellipse, or President's Parade Ground, to remain, but the more informal portions of Downing's landscape park were replaced by the dreary expanse of coarse grass and hard pavement that only in recent years has been bordered with structures of sufficient importance to give dignity and meaning to the whole.³⁷

The greater formality to be noted in parks and other public spaces designed around the turn of the century might also be found in the more ambitious private gardens of the period. Of these, the most noted were provided by Olmsted as the landscape setting of Biltmore, the George W. Vanderbilt estate near Asheville, Tennessee. But no less characteristic or tasteful in their own way were the architectural gardens in which Wilson Eyre, Jr. (1858-1944) set the delightful country houses he planned for well-to-do Philadelphians in the period 1880-1920. While always closely identified with his own city, Eyre's influence was felt beyond Philadelphia in a variety of ways, but especially through the pages of *House and Garden*, which he helped to found in 1901. As its title implied, a major tenet of the new magazine was the belief that a house and its setting formed an inseparable unit that had always to be considered together.

In arriving at his design for Central Park, Olmsted drew on what he had seen abroad, especially Joseph Paxton's Birkenhead Park (begun 1844) near Liverpool, and more and more, study and travel in Europe provided American architects and landscape designers with artistic inspiration and a new sense of professionalism. The small group of men who gathered in New York to found the American

Institute of Landscape Architects early in 1899 appropriately included Downing, Vaux and Frederick Law Olmsted, Jr. The latter was also among those who saw that a fellowship in landscape architecture was established in 1915 at the American Academy in Rome.³⁸

Though both his parents were American, Eyre had spent his early years in Italy and, beginning about 1891, the influence of Renaissance art and gardens became increasingly apparent in the work of men like Charles A. Platt (1861-1933). Partly as an outgrowth of a trip to Italy he had made with a younger brother, in 1894 Platt published a book on Italian gardens that did much to remind his countrymen of the merits of the kind of strongly architectonic designs they had all but forgotten in their preference for the curvilinear naturalism of the English School or for the often spotty confusion of the Gardenesque. In no sense imitative, Platt's designs exploited the axis, the terrace, and the clear geometric relationships that also characterized the best work of his Renaissance predecessors.



Garden of Charles A. Platt, Cornish, N.H. Designed by the owner.

The son of a successful lawyer, Platt had trained first as a painter and etcher before turning to the design of buildings and their sites. Throughout his work, interior spaces are related to those of the exterior through a series of clear, geometric statements that carry the flavor of the Italian garden without ever being a copy of any specific example. And whatever the means employed, the result was always a highly personal one. As Royal Cortissoz remarked in his introduction to the collection of Platt's garden designs, "you know when you follow his footsteps that an artist has passed that way."

From Monograph of the work of Charles A. Platt (New York, 1913).

But two world wars, the Great Depression, and an ever-increasing tax on personal income left few who could afford—or who would supply the labor to maintain—such grandeur as Olmsted and Platt had provided for their clients. The landscape architect, as he was now regularly called, was often as much ecologist as artist. And though public or governmental institutions might provide a few

large commissions, most designers were obliged to work around the restricted forms of patio and swimming pool, carefully selecting plants and materials that required the least care and maintenance. The results they achieved were occasionally striking and original, but a decision as to whether they can fairly be described as "modern" or "American" in the same sense we speak of earlier designs as being "French," "English," or "Italian," should probably be left to our successors who have the benefit of greater perspective.

More certain is the esteem in which earlier Americans held the garden. "It is a higher order of genius to create a pleasing landscape..." Thomas Meehan (1826-1901) wrote in 1852, "than to form a piece of sculpture of ordinary merit; genius does not rule so proudly in poetry or music, drawing or painting, as she does in the art of landscape gardening."³⁹ A horticulturist, trained at Kew before settling in Philadelphia as Superintendent of Bartram's garden (then owned by Andrew M. Eastwick), Meehan's views could hardly be considered unbiased, but there seems little doubt that he spoke for a majority of his countrymen.

Notes and sources:

1. See: Leighton, Ann — *Early American gardens; "for meate or medicine,"* Boston: Houghton Mifflin Company, 1970, for a full discussion of the seventeenth century garden.
See also: Favretti, Rudy J. — *Early New England gardens: 1620-1840.* Sturbridge, [Mass.]: Old Sturbridge Village, 1962, and his *New England colonial gardens* (Chester [Ct.]: Pequot Press, 1964), for brief introductions to the subject.
2. Dutton, Joan Parry — *The flower world of Williamsburg.* New York: Holt, Rinehart, and Winston, for Colonial Williamsburg, 1962. P. 55.
Provides a useful list of most of the trees, shrubs, flowers, vines, and herbs known to eighteenth century Virginians.
3. Watkins, Walter Kendall — "The Hancock house and its builder." In, *Old-time New England* 17:7 (July) 1926.
4. Lockwood, Alice Gardner B. (Comp.) — *Gardens of colony and state. Gardens and gardeners of the American colonies and of the Republic before 1840.* ... Compiled and edited for The Garden Club of America by ... 2 vols. [New York]: Charles Scribner's Sons, for The Garden Club of America, 1931. Vol. 1, pp. 34, 344.
5. *Ibid.*, Vol. 1, pp. 211, 214.
Malbone's fine house burned in 1766, but as late as 1787 Manasseh Cutler found the gardens worth a visit. Malbone Garden was open to the public, for a small fee, in the early nineteenth century. In 1848 the New York architect A.J. Davis (1803-1892) used the pink sandstone of the old residence for a Gothic mansion, which its new owner, J. Prescott Hall, appropriately named Malbone.
6. Whiffen, Marcus — *The public buildings of Williamsburg.* Williamsburg: Colonial Williamsburg, 1958. P. 88.
7. Keith, Sir William — *History of the British plantations in America.* London: 1738. Quoted by Marcus Whiffen in *The Public buildings of Williamsburg* (1958), p. 68. See Note 6.
8. Griswold, Ralph E. — "Early American garden houses." In, *Antiques* 98: 82-86 (July) 1970.
9. Lockwood, Alice Gardner B. (Comp.) — *Gardens of colony and state.* [For full citation see Note 4.] Vol. 1, p. 31.

The detailed Joshua Barney map of 1843 shows clearly a series of terraces at Hampton, the great house that Charles Ridgely began in 1787 near Towson, Maryland.

See: Peterson, Charles E. — *Notes on Hampton Mansion: Hampton National Historical Site*. Washington, D.C.: U.S. Department of the Interior, National Park Service, 1970.

10. See: Hussey, Christopher — *English gardens and landscapes 1700-1750*. London: Country Life Limited, 1967, for the best discussion of the earliest phase of the English style in gardening.
See also: Clark, H.F. — *The English landscape garden*. London: Pleiades Books, 1948.
11. Pevsner, Nicholas — “The genesis of the picturesque.” In: *The Architectural Review* 96: 139-146 (Nov.) 1944.
12. See: Stroud, Dorothy — *Capability Brown*. New edition. London: Faber & Faber, 1975. Provides the most comprehensive treatment of Brown's career.
13. Bill, Alfred Hoyt — *A house called Morven*. Princeton: Princeton University Press, 1954. P. 29.
14. *Ibid.* p. 31.
15. Betts, Edwin M. & Perkins, Hazlehurst Bolton — *Thomas Jefferson's flower garden at Monticello*. Richmond: The Dietz Press, 1941. P. 12. Reprinted: Charlottesville: University Press of Virginia, 1971.
16. Lockwood, Alice Gardner B. (Comp.) — *Gardens of colony and state*. [See Note 4.] Vol. 2, p. 62.
17. Washington's original orangery was completed in 1789 and burned in 1835. The present structure dates from 1950-51.
See Britz, Billie Sherrill — “Environmental provisions for plants in seventeenth century northern Europe,” in, *Journal of the Society of Architectural Historians* 33: 133-144, (May) 1974, for European origins of the orangery or greenhouse.
18. Lockwood, Alice Gardner B. (Comp.) — *Gardens of colony and state*. [See Note 4.] Vol. 2, p. 60.
19. Cutler, William Parker & Julia Perkins — *Life, journals, and correspondence of Rev. Manasseh Cutler LLD*. . . 2 vols. Cincinnati: R. Clarke & Co., 1888. Vol. 1, p. 262.
20. Hislop, Codman & Larrabee, Harold A. — “Joseph Jacques Ramée and the buildings of North and South Colleges.” In, *Union Alumni Monthly* 27: 112-127 (Feb.) 1938.
See also: Larrabee, Harold A. — “Joseph Jacques Ramée and America's first unified college plan.” In, *Franco-American Pamphlet Series*, No. 1 (New York, 1934).
In 1813-14 Ramée was listed in the *Philadelphia directory*, and by 1816 he was in Baltimore where he laid out Calverton, the estate of Dennis A. Smith.
21. See Tatum, George B. — Introduction, in Downing, Andrew Jackson — *The architecture of country houses*. [Ed. 1. New York: 1850.] Reprint: New York: Da Capo Press, 1968; and, Introduction, in Downing, Andrew Jackson — *Rural Essays*; . . . [Ed. 1. New York: Geo. P. Putnam & Co., 1853.] Reprint: New York: Da Capo Press, 1974. These provide a discussion of the principal aspects of Downing's life and career.
22. Mayall, R. Newton — “Country seat of a gentleman ‘The Vale’.” In, *Old-time New England* 43: 11-15, 1952.

23. Wainwright, Nicholas B. (Ed.) — *A Philadelphia perspective: the diary of Sidney George Fisher covering the years 1834-1871*. Philadelphia: The Historical Society of Pennsylvania, 1967. P. 228.

24. *Ibid*, p. 202.

25. The Italian villa that John Notman designed for Joshua Francis Fisher was destroyed when the Rosenwalds built the present house. Brookwood, the Elizabethan house that Gervase Wheeler designed for Henry Fisher, was pulled down in the 1930s. (*Ibid*, p. 230.)

26. Downing, Andrew Jackson — *A treatise on the theory and practise of landscape gardening; adapted to North America; ... 4th edition, enlarged, revised, and newly illustrated*. New York: G.P. Putnam, 1849. P. 429.
The association of Downing's name with the garden of the Read House is based on a long-standing tradition for which there is no firm documentation.

27. Stroud, Dorothy — *Humphry Repton*. London: Country Life Limited, [1962].

28. Scott, Frank Jesup — *The art of beautifying suburban home grounds of small extent; ... New York: D. Appleton & Co., 1870*.
Elliott, Franklin Reuben — *Hand-book of practical landscape gardening, designed for city and suburban residences, and ... Rochester, [N.Y.]: D.M. Dewey, 1877*.
Scott dedicated his book to "the memory of A.J. Downing, his friend and instructor" and quite possibly he had worked briefly in Downing's Newburgh office before opening his own practice in Toledo, Ohio, in 1852, the year of Downing's death. Though Scott closed his architectural office in 1859 to enter the real estate business, he apparently did not forget his earlier interest and training.

29. See: Tatum, George B. — "The emergence of an American school of landscape design." In, *Historic Preservation* 25: 39 (Apr.-June) 1973.
Reproduces an early engraving that may reflect Downing's design for the grounds of The State Hospital in Trenton, N.J.

30. Haskell had the advice of the important New York architect A.J. Davis and the assistance of several landscape gardeners, notably Eugene A. Baumann and Howard Daniels. See: Davies, Jane B. — "Llewellyn Park in West Orange, New Jersey." In, *Antiques* 107: 142-158, 1975.
Evergreen Hamlet was established in 1851 on 85 acres by several well-to-do families who sought a rural retreat that would be near the city but not a part of it. See: Kaufmann, Edgar Jr. (Ed.) — *The rise of an American architecture*. New York: Praeger and The Metropolitan Museum of Art, 1970. P. 230.

31. See: Morgan, Keith N. — "The landscape gardening of John Notman, 1810-1865." MA thesis ms. [unpublished]. [Newark, Del.]: University of Delaware, Winterthur Program in Early American Culture, 1973.

32. The late 1960s saw a renewed appreciation of Olmsted's work, as evidenced by the publication of books such as:
Fein, Albert (Ed.) — *Landscape in to cityscape: Frederick Law Olmsted's plans for a greater New York City*. Ithaca: Cornell University Press, 1967.
Fabos, Julius Gy., Milde, Gordon T., & Weinmayr, V. Michael — *Frederick Law Olmsted, Sr.: founder of landscape architecture in America*. Amherst: University of Massachusetts Press, 1968. A catalogue of a travelling exhibition.
Roper, Laura Wood — *F.L.O.: a biography of Frederick Law Olmsted*. Baltimore: The Johns Hopkins University Press, 1973.
Reed, Henry Hope & Duckworth, Sophia — *Central Park: a history and a guide*. New York: Clarkson N. Potter, Inc., 1967.

33. Lancaster, Clay — *Prospect Park handbook*. New York: Walton M. Rawls, 1967. Murray, A.L. — "Frederick Law Olmsted and the Design of Mount Royal Park, Montreal." In, *Journal of the Society of Architectural Historians* 26: 163-171 (Oct.) 1967.

In 1867 Olmsted made a study of Fairmount Park, but no evidence has been found that he had much influence on today's design. See: White, Theo B. — *Fairmount, Philadelphia's park: a history*. Philadelphia: The Art Alliance Press, 1975. Pp. 36-43.

34. Cleveland, Horace William Shaler — *Landscape architecture as applied to the wants of the West*. ... Chicago: Jansen, McClurg & Co., 1873. Republished. Edited, and with introduction by Roy Lubove (Pittsburgh: University of Pittsburgh Press, [1965].

Lubove suggested that Cleveland was probably the first to give published form to the term "landscape architecture." Before the Civil War, Cleveland practiced in Boston with Robert Morris Copeland as his partner.

35. See: Weidenmann, Jacob — *Beautifying country homes: a handbook of landscape gardening*. New York: Judd & Co., 1870.

36. For his father's tribute, see: [Eliot, Charles William] — *Charles Eliot, landscape architect, a lover of nature and of...* Boston & New York: Houghton, Mifflin and Company, 1902.

37. The Park Commission, under chairmanship of Senator James McMillan of Michigan, was composed of such major practitioners of the arts, as Frederick Law Olmsted, Jr., Daniel H. Burnham, Charles F. McKim, and Augustus St. Gaudens.

For a history of Washington Mall see:

Washburn, Wilcomb E. — "Vision of Life for the Mall." In, *American Institute of Architects Journal* 47: 53-59 (Mar.) 1967.

Reps, John W. — *Monumental Washington*. Princeton: Princeton University Press, 1967.

Reiff, Daniel D. — *Washington architecture, 1791-1861; problems in development*. Washington, D.C.: U.S. Commission of Fine Arts, 1971. Pp. 113-121.

38. Newton, Norman T. — *Design on the land; the development of landscape architecture*. Cambridge, [Mass.]: The Belnap Press of Harvard University Press, 1971. Pp. 385-399.

39. Meehan, Thomas S. — "Notes on landscape gardening." In, *The Horticulturist* 7: 92-94 (Feb.) 1852.

The Development of American Horticulture

George H. M. Lawrence

The Bicentennial Year, more than anything else, has shifted the focus of American thought from events of the present to the heritage accrued from the efforts of our American predecessors. Much has been done on the subject for the arts, so should it be done for the sciences. And horticulture is a science.

To live in the past can be wasteful of one's talents and counter-productive of one's time. But to be informed of the past, and knowledgeable of its contributions, is to be materially richer about the present. This is especially true of horticulture because there is so much that is interesting, and fascinating about the plants we grow and know.

There is a tendency to believe that the vast majority of our garden plants came to this country by way of the British Isles. And a great many of them did. But remember too, that when Anglo-saxon settlers arrived in Jamestown, in 1607, and saw fruiting peach trees grown by the Indians, they believed the fruit to be native to Virginia. The fact is, a Spanish race of the peach was introduced into Mexico by Cortes in 1519. Thanks to various tribes of Indians, it was distributed in the next few decades along the Gulf coast and upwards along the Atlantic coast to Virginia. Cortes introduced also the grapefruit, and, probably, the olive.¹

There is a tendency today to forget how early in American history were some crops the mainstay of economic survival. Here the line between horticulture and agriculture is not drawn sharply, but consider for a moment that —

In the 1690's rice was an important export crop from South Carolina; by 1715 3,000 tons were shipped to other countries.

By 1650, tobacco — first planted as a crop by John Rolfe and Pochahontas — was the major crop of Virginia; 9 million pounds were exported from Virginia and Maryland in 1670; it was a crop whose export would be over 100 million pounds by 1775.²

Cotton, long cultivated in India, and by the mid-1500's grown in Brazil for export, was not grown here for export until about 1785. And, for the balance of that century the domestic market absorbed close to 90% of the country's production.^{2 3}

Sugar, first grown on a major scale in Louisiana in the early 1790's, reached the million pound mark by 1800. It was not big business though until 1830, when steam-powered mills came into operation.⁴

Sweet potatoes, introduced also by the Spaniards in the mid-1500's, and disseminated along the Atlantic seaboard by the Indians, were grown by the colonists but did not achieve importance until large acreages were grown for slave food. Yams, never so popular, came into the South in the early 1700's from the West Indies, and were grown in the Philadelphia area in the 1740's.⁵

Most of these crops were those grown from Maryland southward. As one considers the rapid growth of their acreage, and the increase in their export, remember, too, that one potential for all of this developed from the arrival in Virginia, in 1619, of a Dutch vessel that delivered and sold 20 black slaves from West Africa.

The story of the potato deserves brief mention. A South American native, it was not known in Mexico in pre-Columbian times. Early accounts of its introduction into Europe and North America are often confused with the sweet potato (then known vernacularly as *betatas*, and from which came its modern Latin

name, *Ipomoea batatas*, and a member of the morning-glory family).

The true potato is believed to have come first to North America in 1565, when John Hawkins brought it to Virginia. In the 1590's, John Gerard, the English herbalist-physician, received tubers from Virginia. The plant was first illustrated by Clusius in 1601, in Leyden, from a plant introduced a year earlier in Vienna. It first became a crop plant for food in Europe (in Germany) in 1710. In the next few decades it became a most important food crop across central and northern Europe.⁶

Bermuda-grown potatoes were the first reported sold in Boston, in 1707. Tubers were brought from Ireland to Londonberry, N.H., in 1716 by Presbyterian colonists. The first report of the potato as a field crop in America does not appear until 1762, in Salem, New Hampshire. By 1806 a few named cultivars were known and grown in the Philadelphia area. In 1848 nearly 100 named cultivars were exhibited at the Massachusetts Horticultural Society.^{7 8 9}

It is known generally that many basic foods came to the colonists from the Indians, and for the most part had come to them from the pre-Columbian civilizations of Peru northward to Mexico. Among these novelties to the emigrants from Europe were: peppers, beans of several kinds, maize (that is, Indian flint corn), the husk tomato, pumpkin, and squash. At the same time, it was the European who brought to these shores the garden pea, crops of the cabbage family, carrots, parsnips, beets and onions, and most leaf-vegetables. The apple, pear, and table cherry, introduced early by the French Jesuit missionaries, were quickly "adopted" by the Indians and to such an extent that, as the Europeans pushed westward across the mountains they were amazed to find mature trees, even orchards, of these fruits being grown by the Indians. The quince, introduced by 1648 into Virginia, from England, was for a century more widely grown throughout the colonies than were apples or pears. Culinary and medicinal herbs were important in every community before 1700.

Rhubarb will be found listed as one of the plants grown here by early colonists. It was grown here in the 18th and 19th centuries for medicinal uses, but is believed to have first been introduced as a food plant in 1770, when Franklin sent seeds of it from France to John Bartram — this, a mere century and a half after its introduction from the continent into England. Even so, it was not until after 1880 that it became prized as an early vegetable, when it got one of its now lesser known common names, pie-plant.¹⁰

Curiously, the Lima bean, better known in earlier times as the Carolina bean, was not grown here much before 1820, and not commonly so until 1840.

The garden strawberry, as we know it today, was first introduced to America from England in 1834, by Charles Hovey of Cambridge, Mass. By 1850 it was an important commercial crop in Tidewater, Virginia, whose fruit — shipped by rail — then brought \$1.00 a quart on the Boston market.¹¹

One other vegetable, the tomato, requires consideration before ornamentals receive their due. Introduced into Europe from Latin America, it was first described by Matthioli in Venice, in 1554, as *pomi d'oro*, and by 1586 was known in France as *pomme d'amours*. By 1656 it was grown in England as an ornamental. Forty years later it was there renamed *tomato* by Hans Sloane. By 1752 it was reported by Philip Miller to be much used in soups. It was not until about fifty years later tomatoes were an important food crop in Sicily, Naples, and Rome.

Introduced to Virginia as an ornamental from Jamaica about 1780, the tomato was unreported as a food source until about 1834. During the next decade its popularity as a vegetable spread rapidly from New Orleans to Boston.^{12 13}

Although food and fiber crops were essential to survival, it is interesting to know what ornamentals were grown here during the later 1600's.¹⁴ ¹⁵ Common in all of the colonies would be

daffodils	hyacinths	tulips
gilly flowers [stocks]	pinks	roses (mostly Dutch)
fritillarias	marigolds	madonna lilies
hollyhocks	sedums	

Thus, when we think of the development of horticulture in this country, one needs some understanding of the basics from which it began.¹⁶

Specialization in all walks of life has created numerous separate industries of what was once horticulture: vegetable crop production, pomology, the citrus industry, the nursery and foliage-plant industries, and certainly the florist industry. The loss across the country of the small farm, and the expansion of suburban living have contributed to the split of horticulture into two separate hemispheres: the commercial and the amateur. Horticulture, as taught today in our vocational schools and universities, is directed largely to meet the commercial interests. For the amateur, the role of horticultural societies, of garden clubs, and of special plant societies takes on added importance.

Nurseries preceded seed houses in America by more than a century. In the Virginia-Maryland area, the landed gentry early imported plants and seeds, first from Great Britain, later from the Continent. Farther north, due in part to rigors of physiography and climate and in part to early industrialization, there were few large plantations even among the wealthy, and the dominant struggling lower middle class had neither the contact with European sources nor the funds with which to purchase plants in any quantity. Small wonder then, that it was in New York and New England where spawned the nursery enterprises: the earliest were two in Connecticut, in the 1640's. Both featured fruit trees: apples, pears, plums, and quinces. Also, bush-fruits: gooseberries, grapes, and currants.

When one thinks of fruit trees, remember that well into the early 1800's the emphasis by orchardists along the Atlantic coast shifted rapidly from fruit important for food, to apple and pear orchards for cider and perry. High sugar producing cultivars, selected also for beverage quality, were imported in quantity from England. Cider, by 1800, was a major export from New England to the West Indies and to the southern colonies. Cider of those days had an alcohol content of 16-20 percent. Its domestic consumption surpassed that of all other alcoholic beverages by a ratio of about 20:1. From 20 to 50 barrels was the usual winter lay-down for the colonial farmer; and cider was commonly used to pay the doctor, cobbler, and merchant. Applejack, siphoned off and bottled in December from barrels of hard cider set out to freeze, was more potent than most brandies, and in great demand.¹⁷

The practise of grafting and budding fruit trees became common in the colonies soon after the Revolution. Prince made no mention of it in his catalogue of 1771, but by 1791 he reported of 35 cultivars, "all are inoculated" (meaning, bud grafted) from known and selected sorts.

From about 1790 to as late as 1850, itinerant peddlers worked as fruit tree grafters in early spring. The sobriquet "grafter" came about because of their use of seedling or "wild-apple" scions instead of those of good cultivars — thus cheating the home owner and orchardist, who would wait a few years to learn he had been duped.¹⁸

The first nationally important nursery in this country was that founded by Robert Prince, in 1737 at Flushing, Long Island, and continued by four generations of his descendants, until about 1865. No other single nursery exerted so

much influence on the growth of fruit culture and ornamental horticulture as did this one. For many ornamentals, their date of introduction to American gardens approximates the date they were first offered by the Prince Nursery. Equally important was the role of this nursery in propagating American trees and shrubs for markets on the eastern side of the Atlantic.^{19 20}

When considering dates of first introduction of both woody and herbaceous plants to this country, one must study the records and writings by such colonial figures as:

John and William Bartram²¹, and of Humphry Marshall²², here in Philadelphia; of

Thomas Jefferson^{23 24} at Monticello and Washington^{26 26} at Mount Vernon; of

Daniel P. and John P. Custis at Williamsburg²⁷; of

Dr. Alexander Garden at Charlestown, South Carolina²⁸; of

Andre Michaux, of France, later of New Jersey and South Carolina^{29 30}; and of

Dr. David Hosack and his Elgin Botanic Garden in Manhattan³¹.

A word of caution is needed for persons seeking dates of introduction of cultivated trees and shrubs. A source often cited is Alfred Rehder's *Manual of cultivated trees and shrubs*³². However, dates given there are for first introduction into cultivation anywhere in Europe or North America. Persons seeking dates of introduction of trees and shrubs into this country should consult Rehder's accounts of 1932 or 1935.³³

In much of the 18th century seeds were sold more from newspaper advertisements than by catalogues, with Philadelphia the center of seed distribution activities. Most seedsmen of that time handled as large an inventory of bulbs from Holland and France as of garden seeds.

As is well known to you, America's first seed house was established here in Philadelphia in 1784 by the Englishman, David Landreth. He had come from England a year earlier to be gardener for Robert Morris. Succeeded by his son David, the business expanded and flourished.^{34 35}

In 1801 a rival appeared on the scene, when the Scotsman, Grant Thorburn, opened his seed house in New York City. Thorburn contracted with a fellow Scotsman in the area, George Inglis, to produce most of the seeds sold in his shop. In 1802 he issued the first seed catalogue published in America; of four pages, with lists of predominately ornamental and medicinal plants.

Again in Philadelphia, it was Bernard M'Mahon from Ireland, who in 1800 began to collect and export seeds of native American plants. His catalogue of 1804 lists seed of about 1,000 species.³⁶

A major source of competition in the seed business came from the 50 or more Shaker settlements in the country. Hedrick noted that for "the first quarter of the 19th century, seeds grown by the Shakers were the best in America." Shakers were the first to put seeds in packets, and to price them by the packet or bag rather than by weight or volume. Less publicized is their extensive culture of poppies for opium production, sold to pharmaceutical houses and makers of patent medicines. Their religious beliefs denied them, as being idolatrous, the enjoyment of flowers for any intrinsic beauty. But the fields of large red poppies brought a secret happiness to those ladies who each day would slit and scrape developing seed pods. The Shakers were also among the largest producers of rose water, used not only to flavor apple pies, but also as a hand and body lotion, and as a pharmaceutical. But rose blossoms were required by the Shaker leaders to be picked stemless, lest one be held in hand, or worse, be carried to one's room and be ad-

mired for its beauty. Herbs in wide assortment were grown by them, quick-dried to retain color and precious oils, and packaged for distribution by grocers from New England to Indiana and Virginia. Many of their communities built fruit drying houses, where large quantities of apples were sliced and dried for market. One of the better known was that at Lebanon, N.Y., near the Massachusetts border.³⁷

The end of the 18th century closed on a horticulture very unlike any we know today.

Few were the catalogues of plants. None had yet been printed in this country solely for seeds.

Advertising was largely by newspapers (mostly weeklies) and by broadsheets or handbills posted in public places.

Commercial fertilizers as we know them today were unknown. In fact, until Baron von Liebig, the German chemist, published in 1840 his classic work, *Organic chemistry* . . ., we knew nothing of the importance to plant growth of the elements nitrogen, phosphorous, and potassium.

Insect pests appear not to have been so serious then as today; perhaps colder winters reduced their prolificness. Certainly little was known of an insect's life cycle. Insecticidal sprays were unknown, and until the 1830's peach borers were treated by filling bored holes with rum or brandy. Next came the use of sulphur plugs,* inserted into the bored holes and stoppered over.

The copper-based arsenical, Paris Green, was one of the earliest insecticides, but did not appear until 1880.

Fruit tree and grape vine diseases were of unknown origin — the pathogenicity of fungi remained to be discovered in the 1870's.³⁸

Earlier, disease symptoms were ascribed to:

- morbid infections of the air,
- vegetable apoplexy, or
- a surcharge of Franklin's electrical fluid.

Remedies included:

- hanging iron objects in the outer branches,
- driving nails in the trunk, as an iron inducing tonic,
- physicking with calomel.

It was not until the 1870's that the French plant pathologist, Pierre Millardet, demonstrated the fungicidal value of copper and a decade later would memorialize his native city in the name Bordeaux Mixture, the base of the leading fungicide of the next half century.³⁹

Grass and clover seeds were sold as bulky unwinnowed chaff, for it was not until the 1830's that threshing machines and fanning mills were made for such small seeds or grains.

There was no cutflower trade as we know it. Closest to it were the seasonal street vendors.

Nursery goods were shipped by boat insofar as possible, and in large quantities.

It was a period of political and economic unrest: industrialization had scarcely begun, and horticulturally the emphasis was more on necessities than pretty frills.

The second half of the 19th century witnessed greater changes in horticulture than any other, before or since. With industrialization there came both booms and crashes in the economy. Per capita purchasing power increased. Expansion was omnipresent. There was expansion in transportation: earlier it was via the canals, then the railroads. There had been expansion in territory: by purchase, by

annexation, by decree. These influenced greatly the rate and direction of horticultural development.

A horticultural literature that was truly American had begun to evolve, with decreasing dependence on that of France and Great Britain. There appeared a growing body of plant literature by and for horticulturists of various areas; first for the South, especially for the Carolinas and Georgia, later in the century for central and northern Florida; the requirements of literature for the Mississippi valley and of the Pacific southwest were recognized, as were those of the Gulf area.

The story of the literature of American horticulture and gardening is a subject by itself. But to place it in perspective, it had its origins in the 1820's. The first truly horticultural journal appeared in Boston, in 1834 — the *American Gardener's Magazine*, short-lived, and followed by Charles Hovey's *Magazine of Horticulture*, which lasted until 1868. By 1900 over 500 horticultural journals came and went in this country. About 40 were current at the start of the 20th century. In 1954 the number of horticultural periodicals then being published in this country was ten-fold, and stood at about 450.

As it did to all but essential industry, the Civil War brought all horticultural activities to a standstill. The horticultural industry in the South was wiped out, literally or at least fiscally. Not until after the post-war depression and bank failures of the early 1870's did momentum build and horticulture again advance, in the north as well as the south.

As is true during every great depression, the seed businesses were the first to prosper in the 1870's. It was a time when a dollar would buy twenty packets of seed, but perhaps only five plants. Post bellum growth in American horticulture was abetted by the then new color lithography. Seed catalogues were among the first to promote their products with gaudy color printed illustrations. The same color printing was early adopted by wholesale nurserymen, especially for fruit trees and berry bushes. Such catalogues became the itinerant plant peddler's sales book; pretty pictures sold his product, not his knowledge of each cultivar. Small matter that perhaps fifty nurseries used the same lithographs.

Almost every state had a horticultural society, although preceded in time by state agricultural societies. The first was the New York Horticultural Society, founded in 1818. Second was the Pennsylvania Horticultural Society (1827). The Massachusetts Horticultural Society, founded in March 1829 was the third of state-wide scope, but was antedated slightly by the 10-county-wide Domestic Horticultural Society, founded in 1828 at Geneva, N.Y., and by the Albany Horticultural Society founded in January 1829. By 1833 there were 40 active horticultural societies in the country, and by the end of the century, this number had doubled and 34 were state horticultural societies.

From early pursuits in horticulture there evolved late in the 19th century separate industries. The schism opened between production and marketing of horticultural crops, although it would be another quarter-century before marketing would come into its own. The expansion of horticulture witnessed the independence of pomology in the 1840's, promoted by a considerable number of state and local pomological societies. Nurserymen and florists formed their own national and regional associations; the American Association of Nurserymen in 1876, and the Society of American Florists in 1884.

As late as 1915, cut flowers were shipped by rail to and from big-city distribution centers in boxes, initially packed in ice and sawdust, and later in specially designed ice-cooled reefer cars. Increased reliability and low cost of the telegraph prompted a group of florists in the central states to organize in 1892 a floral tele-

graph service, as a stimulus to local business. It failed in a few years for lack of central fiscal control over the more remote subscribers. Reorganized in 1910, and substantially funded by every participating member, FTD as we know it today got its start as a national and later international horticultural trade association.⁴⁰

During the 19th century the interests of the amateur horticulturist were best served by the state horticultural societies, because as the fruit growers segregated into their pomological societies, amateur interests dominated the residue. Horticultural society journals continually shifted in content to meet the amateur's interests. Very few special plant societies were active at the end of the last century, and those that did exist were controlled by commercial interests, such as the American Carnation Society, founded in 1891.

American horticulture of the 19th century was enriched by the introductions, mostly via Europe, of discoveries of new exotics sent by plant explorers from Africa and Asia, and to a lesser extent from tropical America and Australia. The great Centennial Exposition staged in Fairmount Park, in Philadelphia, in 1876, made its mark on American horticulture. It did so through its great glass-house conservatories and the wealth of then rare exotics on display. From its stimulus the stove-house of European origin, economical to maintain, increased in popularity to the mid-west as well as throughout the east. Home conservatories, ranging from expanded bay-windows to annexes replete with curvilinear glass fronts, became the vogue. With this there was an increased demand for foliage plants and espaliered fruits. True tropical houses were built by municipalities and by wealthy individuals. Some only for orchids, some featured large wardian cases for filmy ferns and exotic insectivorous plants. Collections of orchids grew competitively among the wealthy. Glass-houses heated with hot water piping were introduced in the 1870's and the year-round florist industry began. Steam heat came in the 1890's. And it is only now that the energy crunch is forcing such establishments out of the colder regions of the country.

It was the Centennial Exposition, with its aquatic house that led to increased interest in waterlilies, the Indian lotus (introduced to Long Island from Japan a few years earlier), and the rare Madagascar lace-plant. However, it was the introduction from France, about 1890, of Marliac's bright-colored hybrids of the waterlily that opened the aquatic plant phase of American horticulture.

In some respects tropical plant culture in the north was a short-lived era, for, except for the independently heated and humidified home-attached greenhouse or its stove room, the acceptance of central heating and resultant near-zero humidity virtually wiped out the potted fern industry, and the home culture of most foliage plants — leaving mostly the rubber plant and ubiquitous aspidistra!

Southern California's favorable climate, together with water for irrigation, was largely responsible for its becoming the nation's center for production of subtropical fruits and nuts. First to dominate the scene was the almond, introduced from the Mediterranean area in 1843, it produced a crop of 500 tons in 1895 and 3,000 tons five years later. By comparison, a crop of 50,000 tons was marketed in 1960. Next in importance came the English or Persian walnut, introduced by 1854, with acceptable soft-shell cultivars available since about 1860.⁴¹

The avocado, native to Mexico and Central America, was cultivated in California for home consumption since 1856, but it was that master Italian plantsman, Emanuel Fenzi (1843-1924), better known by his pen-name of Francisco Franceschi, who in 1900 introduced the avocado seedlings from Mexico that became the progenitors of today's superb commercial varieties.

Today, California produces only pickled ripe olives as a commercial product from that tree. It has done so since 1900. But olive trees were brought in by

Spanish missionaries, and olive tree production for oil only was a profitable business from 1860 through 1880's. But by 1895 imports from Spain, Italy, and North Africa had wiped out olive oil as an American product.

The citrus industry was long divided between Florida and southern California, especially for the orange crop — where each area produced types best suited to their respective climates. Curiously, as late as 1880, the grapefruit was treated only as an ornamental in this country. Then, through selection, thinner rhined more juicy fruited clones were produced and during the 1890's California became the center of a grapefruit industry. Later it would lose that honor to Texas. However, only in California is there an environment favorable to commercial production of lemons in America. First to be established, in 1853, was a grove of the Lisbon lemon, and by 1890, replaced by better cultivars, flourishing lemon groves had created a new crop for the American market.^{42 43}

Trees of the edible date have been grown in San Diego since 1769, and commercially from 1859 onwards. But America's date industry got its start in the period of 1900 to 1904 through introductions by the U.S.D.A. of choice cultivars from Africa and Mesopotamia. From a crop of 56 tons in 1919, the industry grew to one of 15,000 tons by 1960. The fascinating story of this later and successful introduction of superb date cultivars, first by Walter Swingle and then by David Fairchild, is too long to relate here.⁴⁴

Interestingly, only two American trees are commercially important for their fruit: the tropical avocado, and the pecan. The latter, native through much of the Mississippi valley region, has its distributional center along the Guadelupe River, northeast of San Antonio, Texas. Although in pre-Columbian times the nuts were an important food crop for the Indians, and in the 16th century were prized by the spaniards, little consideration was given the pecan during the 18th and much of the 19th century. It was then better known, and of greater commercial value, for its timber than for its nuts. With the selection of larger and thinner-shelled nuts, the pecan became an important but unreliable crop in Texas and Mississippi. After the turn of this century it was widely planted in Georgia, where today it is the state's leading orchard crop, with annual yields having a value in excess of \$50 million.^{45 46}

The twentieth century has witnessed marked changes in horticultural products and practises. These have been coupled with socio-economic changes too numerous to elaborate here. Notable factors responsible for changes have been in the areas of controllable refrigeration for storage and shipment, the availability of electricity as a heat source for plant growth and for light by which to control day-length. The displacement of railway express by air express has expanded markets. Technological advances in pest and disease control, in plant nutrition, and in the genetic improvement of breeding stocks have aided in the conversion of horticulture from family-operated enterprises to corporate giants. Increases in labor costs forced the disappearance of large estates and of extensive private glass-house collections. The constant effort to cope with rising labor costs has forced many nurseries to reduce plant inventories, and in others to virtually eliminate extensive collections of garden perennials. The rock garden is today a luxury, enjoyed mostly by those able to handle their own maintenance work. A continuing reduction proceeds in the number of firms engaged in cut-flower production under glass. And the sordid story of today's "super-power" infiltration of eastern wholesale flower markets, and restraint of free trade remains to be revealed.

Changes in life style from private residences to apartment living have affected the pot-plant industry, not only in extent but in kinds of plants grown. Ferns,

once the stock of every florist shop, are available today in a small fraction of quantity or choice of kinds of a half-century ago. The availability of quality control for fluorescent lights has increased the use of that energy source, but aesthetically must be restricted to a relatively small part of the living area. Glassed in "growth chambers" and the lean-to greenhouses permit the culture of exotics, but only for the more affluent. Florist shop space given to showy potted plants in flower is increasingly displaced by dried flower materials and, yes, by plastic imitations of the real and unreal. And some shops have only imitation flowers, often in colors more vivid than man ever saw in nature.

For many, nostalgia for the past evokes the query "what riches await the horticultural interests of succeeding generations?" A new era is with us. While horticultural pursuits for the amateur will increase as the population of retirees increase, and gardening for the home table will expand as more families seek rural living, there remains the millions in this country who have yet to grow a living flower or to know the feel of mother earth.

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